

Withdrawal of care may occur too soon in cardiac arrest patients who receive hypothermia treatment

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Physicians may be making premature predictions about which patients are not likely to survive following cardiac arrest – and even withdrawing care -- before the window in which comatose patients who have received therapeutic hypothermia are most likely to wake up, according to two new studies from the Perelman School of Medicine at the University of Pennsylvania. The research helps to better define the proper timeframe and manner in which doctors may be able to predict which patients will regain consciousness after the use of therapeutic hypothermia, which preserves brain and other organ function following cardiac arrest.

Patients treated with hypothermia often don't regain consciousness until three or more days after their cardiac arrest, according Penn research that will present today at the American Heart Association's annual Scientific Sessions (Abstract #10778. But in a separate Penn study published online this week in *Critical Care Medicine*, a chart review found that documentation of "poor" or "grave" prognosis occurred early on in 57 percent of cardiac arrest patients' treatment with hypothermia, with a quarter of those patients' care being withdrawn within 72 hours after their arrest. More than 20 percent of those patients – whose doctors predicted they would die or suffer severe brain damage – actually survived to discharge with a good neurological outcome, meaning they had mild or moderate cognitive deficits, but were able to live independently and often, resume their work and family responsibilities.

"Hypothermia improves survival after cardiac arrest, but it's changing our assumptions about how and when we should talk about withdrawing life support," said David Gaieski, MD, an assistant professor of Emergency Medicine, who led the research that will be presented at the AHA Scientific Sessions. "In the therapeutic hypothermia era, the timeframe for neuroprognostication needs to be prolonged, with decisions about withdrawal of care delayed until several days after the cardiac arrest -- at the earliest. Patients benefit from being managed by multidisciplinary teams that include experts in resuscitation as well as cardiologists, intensivists, and neurologists."

His study found that time to arousal following resuscitation and [therapeutic hypothermia](#) is highly variable – and often longer than three days. Of 154 patients studied in three hospitals over a five-year period, the researchers found that 42 percent of patients studied survived to discharge from the hospital. Seventy two percent of those patients had a good neurological outcome. The mean time to arousal, which the researchers defined as the point at which the patient began following commands purposefully, was 3.8 days, with a range of 0.5 to 14.5 days. Even among those who were discharged in good neurological condition, the mean time to arousal was 3.2 days, indicating that efforts to predict a patient's outcome early during cooling are not likely to be effective. The study found that patients who had kidney problems prior to their arrest, had an initial heart rhythm that could not be shocked back to normalcy, and who did not receive paralytic drugs during their treatment were more likely to take longer to regain consciousness.

In an effort to better determine which tests might help pinpoint which patients may survive with fewer cognitive impairments, Merchant's team also studied the use of head CT, electroencephalography, and somatosensory evoked potential testing following arrest in the cases they examined. Although at least one of these tests were commonly used, they were used at a variety of different points following arrest, and are known

to be less precise when the body temperature is below normal, partly because drugs that can impact test results accumulate in the body under those conditions. In addition, the researchers note that prognostication while a patient is paralyzed and sedated – necessary during the hypothermia procedure to keep [patients](#) comfortable – presents special ethical challenges.

"We need additional studies to better understand the optimal timing and diagnostic tools for post-arrest prognostication," said Raina Merchant, MD, MS, an assistant professor of Emergency Medicine and senior fellow in the Leonard Davis Institute of Health Economics, who led the research published in *Critical Care Medicine*. "This work is essential for improving the care we provide for [cardiac arrest](#) survivors."

Provided by University of Pennsylvania School of Medicine

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