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Value of Therapeutic Hypothermia After Cardiac Arrest Confirmed by New Research

Mayo Clinic researchers confirmed that patients who receive therapeutic hypothermia after resuscitation from cardiac arrest have favorable chances of surviving the event and recovering good functional status. In therapeutic hypothermia, a patient's body temperature is cooled to 33 degrees Celsius following resuscitation from cardiac arrest, in order to slow the brain's metabolism and protect the brain against the damage initiated by the lack of blood flow and oxygenation.

This study was published in the December 2010 issue of *Annals of Neurology*.

"Therapeutic hypothermia is a neuroprotective strategy. Brain recovery is the main determinant of outcome for patients who survive cardiac resuscitation," says Alejandro Rabinstein, M.D., a Mayo Clinic Neurologist. "For a number of years, we have collected information about what determines whether or not a patient is going to wake up after resuscitated cardiac arrest. However, most of this information comes from the time when patients were not treated with therapeutic hypothermia, which now has become the standard of care for many cases of cardiac arrest. We wanted to know whether hypothermia therapy changed what we knew before about how to estimate neurological prognosis in these patients."

In this study, Dr. Rabinstein and his team identified 192 patients, more than 100 of whom were treated with therapeutic hypothermia. Detailed neurologic exams were performed, including electroencephalograms, brain CT scans, and measurement of neuron-specific enolase (NSE). NSE is a substance detected in the blood that provides information about the extent of brain damage. "The results of the study mainly validated what we knew about prognosis following cardiac arrest from non-hypothermia cases. The findings on physical examination on the days following cardiac arrest remain most valuable in estimating the prognosis," says Dr. Rabinstein.

High NSE level in the blood was shown to reliably predict poor outcome after cardiac arrest in patients not treated with hypothermia. However, less is known about the value

of this marker in patients who are cooled after the cardiac arrest. Although in this study the presence of elevated levels of NSE was statistically associated with worse outcomes in patients treated with hypothermia, Dr. Rabinstein concluded that the NSE level was not sufficiently reliable to estimate the prognosis in this group of patients because elevated levels were also seen in some patients who recovered well. Therefore, the NSE level should not be used in isolation to define prognosis in patients treated with hypothermia. "That was a remarkable finding of our study that deserves more attention," he says.

"It's important for people to know that among patients treated with therapeutic hypothermia following resuscitated cardiac arrest, up to two-thirds of them may go home with good function," says Dr. Rabinstein. "We are still examining how these patients recover in terms of higher intellectual faculties, but certainly these are results that were not even conceivable prior to the application of therapeutic hypothermia."

Other members of the Mayo team included Jennifer Fugate, D.O.; Eelco Wijdicks, M.D., Ph.D.; Jay Mandrekar, Ph.D.; Daniel Claassen, M.D.; Edward Manno, M.D.; Roger White, M.D.; and Malcolm Bell, M.D.

Source: Jennifer E. Fugate, Eelco F.M. Wijdicks, Jay Mandrekar, Daniel O. Claassen, Edward M. Manno, Roger D. White, Malcolm R. Bell, Alejandro A. Rabinstein. Predictors of neurologic outcome in hypothermia after cardiac arrest. *Annals of Neurology*, 2010; 68 (6): 907 DOI: 10.1002/ana.22133