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Out-of-Hospital Hypothermia With Cold Saline Nearly Doubles Survival of Cardiac Arrest Patients

October 4, 2010 (Las Vegas, Nevada) — When emergency medical services added induced hypothermia with cold saline to standard postresuscitation care, the survival rate of patients with a return of spontaneous circulation in the field nearly doubled, according to a study presented here at the American College of Emergency Physicians 2010 Scientific Assembly.

Researchers evaluated the hospital discharge summaries of survivors of out-of-hospital return of spontaneous circulation before and after the introduction of a new protocol for therapeutic hypothermia.

According to their results, overall survival before the protocol was implemented was 17.2%, whereas after it was implemented, overall survival was 28.8%, with an adjusted odds ratio of 1.9 (95% confidence interval [CI], 1.2 - 3.1).

Importantly, survival rates improved from the before to the after groups for all initial rhythms, including ventricular fibrillation (VF)/ventricular tachycardia (VT) (41.8% vs 54.5%), pulseless electrical activity (PEA) (4.4% vs 16.1%), and asystole (3.8% vs 10.1%). The best survival outcomes were seen for VF/VT, which had an adjusted odds ratio of 8.6 (95% CI, 5.5 - 13.3).

"It was very encouraging that we saw a trend toward an improvement in survival in each rhythm," said Brent Myers, MD, a coauthor on the study and medical director for the Wake County EMS System, headquartered in Raleigh, North Carolina.

Even more encouraging, he said, was the finding that there were no statistically significant differences in the before and after groups in the proportion of patients with a good neurologic outcome. Previous studies have indicated that patients at risk for ischemic brain injuries might have better outcomes if treated with therapeutic hypothermia.

"The outcome measure for the study was primarily discharge from the hospital, but the more important question is whether the [Pittsburgh Cerebral Performance Categories] scores at the time of discharge indicated that the patient was neurologically intact," he said.

"At the time of discharge, 3 of 4 patients in both arms were neurologically intact, but we just doubled the survival rate in the hypothermia group and still had a very robust number of patients who left the hospital," he said. "So we were very happy that these individuals were not left in a persistent vegetative state."

The study comprised 227 patients in the before group and 413 in the after group; baseline characteristics were similar in both groups, including mean age (65.9% vs 65.2%), male sex (52.1% vs 59.6%), mean response interval from 911 call to first arriving unit (5.6 vs 5.6 minutes), and VF/VT rhythm (35.0% vs 38.4%).

Dr. Myers noted that, contrary to some assumptions, age did not strongly affect the chance of survival with therapeutic hypothermia.

"We found in the odds ratio of survival that age does affect survival, but the decrease in survival is small," he noted, adding that increasing age was not significantly associated with survival.

According to Brian J. O'Neil, MD, moderator of the session, the study offers some impressive survival statistics for therapeutic hypothermia.

"I wasn't surprised with the VF/VT patients, but I was very surprised with the recovery rate of the PEA and asystole patients, he said. "These are among the best outcomes in the country."

He said hospitals might have various reasons for not establishing a therapeutic hypothermia protocol, but the benefits clearly outweigh the costs.

"I have heard all of the reasons, including [that it is] too much of a capital expenditure and too labor-intensive, but they are weak arguments," said Dr. O'Neil, associate chair of research and director of basic science research at Wayne State University School of Medicine, in Detroit, Michigan.

"Ice and cooling blankets cost nothing and the cost and labor to care for nursing home patients makes these arguments short-sighted."

Dr. Myers has disclosed no relevant financial relationships, although one member of the research team was on the Physio-Control EMS Fellowship during the project. Dr. O'Neil reports receiving grant support and being on the speakers board for Medivance, maker of the Arctic Sun therapeutic temperature management product.

American College of Emergency Physicians (ACEP) 2010 Scientific Assembly: Abstract 13. Presented September 28, 2010.