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Citation: Rao MP, Dupre ME, Pokorney SD, Hansen CM, Tyson C, Monk L, Pearson DA, Nelson RD, Myers B, Jollis JG, Granger CB. Therapeutic Hypothermia for Patients with Out-of-Hospital Cardiac Arrest in North Carolina. *Prehosp Emerg Care*. 2016 Sep-Oct;20(5):630-6. doi: 10.3109/10903127.2016.1142627. Epub 2016 Mar 17. PubMed PMID: 26985981.

Question: Review the use of therapeutic hypothermia for patients with out-of-hospital cardiac arrest in North Carolina.

Background: Previous studies demonstrate improved survival to hospital discharge with therapeutic hypothermia for unconscious patients with ROSC following out-of-hospital ventricular fibrillation cardiac arrest. Subsequent studies have not shown additional benefit of earlier or cooler therapeutic hypothermia. Current recommendations call for targeted temperature management of these patients and do not advocate for pre-hospital rapid infusion of large volumes of cold intravenous fluid.

Methods: This study used a cardiac arrest registry from EMS and hospitals to measure treatment and outcomes of out-of-hospital cardiac arrest. Data included information on patient demographics, medical history, and details about the cardiac arrest event. All adults in the registry during 2012 were included for a total of 3580 patients. Patients with missing outcomes, field death, those with DNR orders, those without ROSC, and those without an advanced airway placed in the field were excluded. This left 847 patients. These patients were then further separated by survival to admission and subsequently ventricular fibrillation vs non-ventricular fibrillation arrest. Outcome measures included survival to hospital discharge and neurologic condition at discharge.

Results: 55% of the 847 patients included in the study received pre-hospital therapeutic hypothermia. These patients were more likely to have hyperlipidemia, bystander CPR, less heart disease, and increased rates of in-hospital hypothermia. 62% of the patients who survived to hospital admission received therapeutic hypothermia. These patients were more likely to be young, have ventricular fibrillation arrest, have a witnessed arrest, and receive pre-hospital hypothermia. Patients who did not have in-hospital therapeutic hypothermia were more likely to be at hospitals that did not have a hypothermia protocol. Improved neurologic outcomes and increased survival to hospital discharge was associated with pre-hospital therapeutic hypothermia. This effect was greater in patients with ventricular fibrillation arrest.

Analysis: This was an observational study and the authors admit their inability to determine cause and effect. It is possible that EMS agencies which have a hypothermia protocol are more regimented and efficient in providing CPR and other cardiac arrest care which in turn leads to better outcomes. It is interesting to note that patients who did not receive therapeutic hypothermia were more likely to be at hospitals that did not have a hypothermia protocol, outlining the importance of establishing such protocols. This also outlines the major conclusion of the study that efforts should be made at improving all aspects of the chain of survival for cardiac arrest.

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