Does the administration of CODE ICE to a cardiac arrest patient result in regained brain function when discontinued?

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Abstract

The increase in heart disease in this country has created the need for more treatment options for out-of hospital cardiac arrest (OOHCA). Therapeutic hypothermia, also referred to as code ice, involves the cooling of a patient's body temperature to around thirty-two degrees Celsius, and it has become a standard of care for patients who are resuscitated after a OOHCA. When these patients experience cardiac arrest outside of the hospital there is a risk for decreased brain function. This decrease in brain function can lead to patient being declared brain dead and placed on a ventilator. However, some research indicates that therapeutic hypothermia has resulted in a higher likelihood of survival and hospital discharge.

Introduction

Therapeutic hypothermia is a procedure that lowers the body's core temperature to 34 degrees from 37 degrees Celsius (Mathiesen, Mcpherson, Ordway, & Smith, 2015). The use of this treatment is called for by the experience of an out-of-hospital cardiac arrest. These arrests are more severe as there is no medical staff directly on hand to treat the patient, and there are more harmful effects. OOHCAs can cause postcardiac arrest syndrome, which includes multi-organ system injuries. This syndrome also accounts for 68% of deaths related to OOHCAs (Hollenbeck, et al., 2012).

Figure 1. Therapeutic hypothermia. From "Staying Cool: An Overview of Therapeutic Hypothermia," by J. Sun, 2016.

Methods and Materials

All articles for this research were found through the CINAHL database available to Longwood students. We first searched using the terminology "Code Ice" then we extended our research to use the term "Therapeutic Hypothermia." We first looked at the titles of the articles to see if they fit with the research we were looking for. Then, we read the abstracts to decide if they would fit our research topic. Lastly, we read the articles and decided their value to our PICO question that asks, does the administration of CODE ICE (I) to a cardiac arrest patient (P) result in regained brain function (O) when discontinued (C).

Figure 2. Therapeutic Hypothermia. From "Therapeutic Hypothermia: Indications & Process," by C. Hacker.

Evaluation & Analysis

It is found from our research articles that therapeutic hypothermia, also known as code ice, does result in regained brain function when used after an out-of-hospital cardiac arrest. The use of therapeutic hypothermia decreases cerebral blood flow, which is meant to decrease brain injuries, but this can also cause new arrhythmias in the heart (Moeller & Webber, 2017). Other physiologic changes occur in the phases of hypothermia treatment. These include bradycardia, hypotension, hypovolemia, and metabolic changes (Scantling, Klonoski, & Valentino, 2014). This treatment is not recommended for in-hospital cardiac arrests, as it results in a decreased survival rate (Chan, Berg, Tang, Curtis, & Spertus, 2016). The treatment of cardiac arrest with hypothermia requires intensive nursing care. Nurses use safety checklists to care for these patients as it "is a complex, tense, and time-sensitive undertaking" (Avery, O'brien, Pierce, & Gazarian, 2015). The use of therapeutic hypothermia requires special care as there are many changes to the body that occur. For example, when being rewarmed after the treatment the patients can spike a fever, which can worsen their neurologic function (Mody, Kulkarni, Khera, & Link, 2019).

Conclusions

In conclusion, therapeutic hypothermia is widely used for the treatment of out-of-hospital cardiac arrests as it has results of regained neurological function. This treatment does not show positive results with every use. There are many deaths related to OOHCAs, even after therapeutic hypothermia. Also, there are many barriers and adverse effects that come with this treatment, but there is not much research on those subjects. The use of therapeutic hypothermia should be decided on a case to case basis.

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