

Therapeutic hypothermia for the second time: is it possible?

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Abstract

Therapeutic hypothermia has demonstrated an improvement in neurological outcomes in patients who experience sudden cardiac arrest. The benefit of this therapy is documented only after its implementation in a one-time basis. We report the case of a patient who

suffered two events of sudden cardiac arrest separately in a short period of time and who underwent therapeutic hypothermia after each episode with outstanding results.

Key words: Therapeutic hypothermia, sudden cardiac arrest, neurological outcome.

Introduction

Sudden cardiac arrest (SCA) is a major problem worldwide. The true incidence of this medical complication remains unclear, and according to recent statistics, reports vary in different series from 180,000 to more than 450,000 cases per year, with cardiovascular disease the most common cause. (1,2)

The percentage of patients who survive and are discharged from hospital after the event is between 15-17% around large epidemiological studies, and quality of life is largely affected usually due to disability associated with secondary neurological damage. (3) Therapeutic hypothermia (TH) for up to 24 hours has demonstrated an improvement in neurological outcomes in patients who experience SCA.

Since the emergence of early clinical trials and the recognition of this method as an adjuvant in these patients, the benefits of TH have been reported only after its implementation in a one-time basis. (4,5) Currently no data are available about the benefit, efficacy and safety of TH applied for the second time in the same patient after experiencing recurrent cardiac arrest.

We report the case of a patient who experienced SCA two times separately in different periods of time and underwent TH after each episode with outstanding results.

Case description

A 63-year-old African American gentleman presented to the emergency department of our hospital in Houston, Texas with a past medical history remarkable for long-term hypertension, diabetes mellitus type 1, coronary artery disease, congestive heart failure, peripheral artery disease, status post below knee amputation, chronic kidney disease on hemodialysis, gastroesophageal reflux disease and asthma.

He experienced SCA and underwent TH with no complications and favorable neurologic outcomes after discharge from hospital (Pittsburgh Cerebral Performance Category of 1). Two months later he was referred to the emergency department because he experienced another

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event of sudden cardiac arrest. He was intubated at scene, and the duration of the event was 20 minutes prior to arrival. Advanced cardiovascular life support and TH were initiated immediately.

The patient underwent TH for 24 hours with no complications. During hospitalization, levels of creatinine increased and the patient underwent hemodialysis two times with return of levels to normal limits. Liver and thyroid function tests were in normal limits.

The patient progressively returned to a normal mental status after rewarming (Glasgow Coma Scale of 15) and neurologic evolution was favorable (Pittsburgh Cerebral Performance Category of 1) with discharge from hospital after two weeks.

Discussion

The use of hypothermia as a therapeutic measure has been described since ancient times. Nowadays, the knowledge about the correct implementation, the indications, devices for its induction, among other peculiarities of this method are available. (6,7) Currently the principal indication of TH is after cardiac arrest to improve neurological outcome, but recommendations are expanding into other clinical scenarios in where benefits have been documented as well. (8,9)

After an episode of SCA, TH is recommended in ranges between 32-34 °C (mild hypothermia) for a period of 12-24 hours when resuscitation results in restoration of a

spontaneous circulation. (10) The majority of the clinical trials have reported the benefits of this therapy only after one event of SCA and have focused on the immediate prognosis. To the best of our knowledge, there are no reports in the literature about the safety and effects on neurological outcomes of this method when applied for a second time in the same patient after recurring events of cardiac arrest.

According to this report, TH may be safe when used in the same patient for a second time if this is required and the beneficial effect in neurological outcomes seems to prevail. At this point it is difficult to ascertain whether the benefit of this therapy is the same regardless of the time between an episode of cardiac arrest and another (short time or long time). In this particular case, the fact that TH was used with favorable results after both events of SCA in a short period of time, might suggest similar outcomes when used after a long period of time.

We recognize the limitations of our conclusions. This is a case report and the evidence that this experience provides may not be strong; nevertheless, remains valuable in the absence of any previously documented cases, and may serve as a preamble for the emergence of clinical trials approaching this issue.

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