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CASE REPORT

Pediatric fatality secondary to EDTA chelation

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Background. Chelation therapy has emerged as a popular treatment modality to remove heavy metals that are thought to cause autism. We report a fatality that occurred as a consequence of chelation therapy for autism when the incorrect form of EDTA was administered. **Case Report.** A five-year-old autistic male was being chelated in a physician's office. While receiving his third treatment he went into cardiac arrest. It was not determined until after the child's death that he had been given edetate disodium rather than edetate calcium disodium, causing profound hypocalcemia and triggering the cardiac events that led to his death. **Discussion.** In 1991, the CDC recommended using only edetate calcium disodium, not edetate disodium, to children because edetate disodium may induce tetany and possible hypocalcemia as illustrated in this case. **Conclusion.** The use of chelation therapy in autistic children has not been validated and can have tragic consequences.

Introduction

Autism is a complex and debilitating neurodevelopmental disorder that is characterized clinically by social deficits, abnormalities in language, and limited and repetitive behaviors and interests (1). It is estimated that three to six of every 1,000 children in the United States are diagnosed annually with autism (2). The presence of heavy metals, especially the mercury preservative (thimerosal) in childhood vaccines, has been proposed but not validated as a cause of autism (3). Parents often take extreme measures to "cure" their child of autism using unconventional and unproven interventions such as chelation therapy to treat autistic children – sometimes with devastating consequences (4). We describe the inappropriate use of chelation therapy in an autistic child that resulted in a fatal outcome.

Case report

A 5-year-old autistic British male was being chelated in a physician's office in Pennsylvania. While receiving his third intravenous edetate disodium treatment, he went into cardiac arrest. Resuscitation was initiated in the physician's office and continued while enroute to the emergency department. On arrival in the emergency department, the poison center was consulted for information on ethylenediamine-

tetraacetic acid (EDTA). It was unknown which EDTA formulation was administered. At that time, it was thought by the emergency department staff that the child was being chelated for high lead and mercury levels with causative factors unknown. Lead and mercury levels were not available to the emergency department physician. The pediatric advanced cardiac life support (ACLS) protocol was followed, including the administration of a standard intravenous calcium dose, but resuscitation efforts were unsuccessful. Blood obtained during resuscitation revealed a calcium level of 6.8 mg/dL following an intravenous calcium bolus. A serum sodium level was within the normal range at 148 meq/L. Postmortem on the child revealed that his chelation treatment recommendations were based on a urine lead level of 15 mcg/g of creatinine. The coroner's examination indicated the cause of death as diffuse, acute cerebral hypoxic-ischemic injury, secondary to diffuse sub-endocardial necrosis. The myocardial necrosis resulted from hypocalcemia associated with the administration of edetate disodium.

Discussion

Cardiac arrest related directly to hypocalcemia is an unfortunate outcome that may result from the administration of intravenous edetate disodium. This case exemplifies one of three documented deaths during 2003–2005 associated with chelation therapy that resulted in a hypocalcemia-related cardiac arrest (4). In 1991, the CDC recommended using only edetate calcium disodium, not edetate disodium in children for conventional chelation therapy (e.g., lead poisoning) because edetate disodium may also chelate

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calcium, thereby inducing tetany and resulting in possible fatal hypocalcemia. The chelation agent administered to this patient was edetate disodium which is not a first-line agent for heavy metal chelation therapy. It forms a soluble chelate with calcium, resulting in a rapid decrease in serum calcium concentrations (5). During the infusion of edetate disodium, serum calcium levels must be monitored closely and intravenous calcium replacement must be available readily.

Chelation therapy is not indicated for the treatment of autism. Although some physicians feel that the mercury preservative found in childhood vaccines is the cause of autism and that the removal of the toxic metal will diminish or eliminate the signs and symptoms of autism, this has not been validated medically (5). Furthermore, an extensive Institute of Medicine report failed to find an association between exposure to mercury-containing preservatives in vaccines and the development of autism (5).

Another case linked to chelation drug errors has been reported (4). Endrate® (edetate disodium) was prescribed to treat a 2-year-old female's elevated blood lead level. The error was discovered and the child received Versenate® (edetate calcium disodium) for her first treatment. The child exhibited no ill effects. On the second day, she received Endrate® accidentally, dropping the calcium level precipitously and resulting in death. The medical records revealed the names Endrate® and Versenate® were being used interchangeably (5). Both of these fatalities were linked to the use of look-alike and sound-alike medications with similar indications and pharmacology which resulted in the wrong medication being administered.

Conclusions

It is unfortunate that this treatment option is available as its efficacy has never been validated. Furthermore, medical practitioners and parents must be educated regarding the potential catastrophic effects from chelation therapy for the treatment of autism. These tragic errors can be eliminated if chelation therapy for autism is abandoned and if all health care professionals are aware that there are two types of EDTA products and they are not interchangeable. Health care facilities should assess whether there is a need to stock edetate disodium – elimination from the formulary is one way to prevent this type of medication error. Despite the lack of scientific evidence to support the effectiveness of chelation as a treatment for autism, desperate and vulnerable parents continue to seek medical professionals who will provide the therapy.

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