

The Use of Cognitive Aid Checklist Leading to a Successful Treatment of Malignant Hyperthermia in an Infant Undergoing Craniosynostosis Repair

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Introduction

- Malignant hyperthermia (MH) is a rare but serious anesthetic complication that carries a poor prognosis if not aggressively treated¹.
- The uses of emergency cognitive aids have been shown to result in better management during perioperative clinical events².
- We present a case where malignant hyperthermia was successfully managed by using an emergency intraoperative checklist (The Emergency Manual) and the MHAUS hotline (Malignant Hyperthermia Association of The United States).

Case Description

- A 4 month-old male with craniosynostosis presented for cranioplasty. On preoperative evaluation, he did not have any other medical problems
- No family history of anesthetic issues
- Inhalational induction was performed, and anesthesia was maintained with sevoflurane, remifentanyl, and dexmedetomidine. After a lengthy surgical skin preparation and draping, the core temperature at time of incision was 34°C.
- Approximately one hour after incision, acute unexplained increases in heart rate (180 bpm) and end tidal carbon dioxide (62 mmHg) were noted and his temperature increased from 34 to 38°C over 5 minutes.
- MH was suspected. Sevoflurane was discontinued, the surgeon was notified, and additional help was called for.

- The Department of Anesthesiology recently implemented “The Emergency Manual” by placing a physical copy at each anesthesia workstation. This manual included information from the Society for Pediatric Anesthesia Critical Events Check list and the Stanford Anesthesia Cognitive Aid Group consisting of algorithms for treating life threatening perioperative emergencies.
- The anesthesiologist designated as the leader assigned specific roles to available operating room (OR) personnel. The “Emergency Manual” was also used to further guide our management.
- Dantrolene was administered and The MHAUS hotline was called for assistance concurrently. Cooling measures were instituted, samples sent for arterial blood gases, lactate, and coagulation profile. The patient’s heart rate and end tidal carbon dioxide normalized rapidly after dantrolene administration.

- He was transported to the ICU and with supportive measures and repeated doses of dantrolene, the patient stabilized and his temperature started to decline. He was extubated on the following day and was discharged from the ICU on postoperative day 3.
- Eight days later, surgery was attempted again under a non-triggering anesthetic technique using propofol and remifentanyl. Surgery was completed without any adverse events.

Discussion

- Management of MH requires early diagnosis, prompt interventions, and smooth coordination of different operating room personnel at the direction of the anesthesiologist for favorable outcomes.
- The incorporation of OR cognitive aids / critical events checklists can give anesthesiologists and healthcare providers a framework to effectively handle this rare emergency and others when time and efficiency are pivotal for improved outcomes.
- Recent studies have suggested that cognitive aids can improve technical performance during rare anesthetic emergencies.³
- As well as emphasizing the need for vigilance in the operating room, this case illustrates the advantages that having checklists and cognitive aids can bring to the clinician. Further studies and refinement are needed to outline the most effective form and implementation system for these devices.

References

1. Clinical Anesthesia (6th Edition) 2009. 598-621.
2. Use of cognitive aids in a simulated anesthetic crisis. Anesth Analg. 2006 Sep; 103(3):551-6.
3. The use of cognitive AIDs during emergencies in anesthesia: a review of the literature. Anesth Analg. 2013 Nov;117(5):1162-71.

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ACLS			
Asystole	1	Hypotension	12
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EMERGENCY MANUAL
COGNITIVE AIDS FOR PERIOPERATIVE CRITICAL EVENTS 2013 V1.1
STANFORD ANESTHESIA COGNITIVE AID GROUP

