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Anesthetic management of 877 pediatric patients undergoing muscle biopsy for neuromuscular disorders: a 20-year review.

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Abstract

BACKGROUND: The objectives are to review the anesthetic management and anesthetic-related adverse events in patients undergoing muscle biopsy for a broad spectrum of neuromuscular disorders (NMD).

AIM: The study aims to assess the hypothesis that perceived awareness of potential anesthesia-induced hyperkalemia and MH in patients with NMD reduces the frequency of such events.

METHODS: A 20-year retrospective review of 877 consecutive patients undergoing muscle biopsy to establish diagnoses of NMD has been performed. Patients were categorized prebiopsy into six groups: M (myopathy and muscular dystrophy), MM (mitochondrial or metabolic myopathy), N (neurodegenerative, peripheral neuropathy or spinal muscular atrophy disorder), D (dermatomyositis), C (cardiomyopathy), or S (seizure disorder). Data were collected for demographics, anesthetic management, pre- and postoperative anesthesia-induced muscle injury, postbiopsy histopathologic diagnosis, and concordance comparisons between pre- and postbiopsy diagnoses.

RESULTS: There were 513 males (58.5%) and 364 females (41.5%) (1.4:1) with 137 individuals (15.6%) operated on under 1 year of age and two-thirds by 6 years of age. NMD diagnosis was reached in 409 (46.6%) while 468 (53.4%) had no specific pathology. No patients exhibited signs of anesthesia-induced muscle injury (malignant hyperthermia, rhabdomyolysis, cardiac arrest, or postoperative deterioration of weakness). MM was the largest group pre biopsy (367, 41.8%). Anesthetic agents were: nitrous oxide in 657 (74.9%); volatile agents in 139 (15.8%); intravenous agents in 836 (95.3%) (primarily propofol, midazolam, and fentanyl); nondepolarizing muscle relaxants in 404 (46.1%); and regional anesthesia in 112 (12.8%) [most commonly spinal anesthesia in 80 (71.4%)]. Comparing preoperative diagnostic category with postoperative diagnosis, there was a concordance of 78% (319/409) between the two for cases with a definitive diagnosis and 89.7% (787/877) for all cases.

CONCLUSIONS: In this retrospective study, no patient exhibited signs or symptoms of hyperkalemia or MH probably because the incidence is very low and becomes even less likely due to the selection of the various anesthetic agents and strategies administered.

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KEYWORDS: anesthesia management; childhood neuromuscular disorders; malignant hyperthermia susceptibility; muscle biopsy

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