
Shonali C Pawar 1, 2, Henry Rosenberg 1, 2, Robert Adanson 3, Ronald S Chamberlain 4, 5

1 Department of Surgery, Saint Barnabas Medical Center, Livingston, NJ
2 Department of Epidemiology, Rutgers University (University of Medicine and Dentistry New Jersey), Piscataway, NJ
3 Director of Medical Education and Clinical Research, Saint Barnabas Medical Center, Livingston, NJ
4 Adjunct Professor of Anesthesiology, Columbia University School of Medicine, New York, NY
5 President, Malignant Hyperthermia Association of the United States, Sherburne, NY, USA
6 Saint George’s University School of Medicine, Grenada, West Indies

INTRODUCTION

Dantrolene is the only drug approved for the treatment of malignant hyperthermia (MH) crisis. Dantrolene depresses the intrinsic mechanisms of excitation–contraction coupling of skeletal muscles by reducing intracellular calcium release, and thus prevents muscle action and molecular targets are not fully elucidated. New information from the literature and the MH Foundation suggests that its use is not only for MH crises, but also for neuroleptic malignant syndrome, serotonin syndrome, neuroleptic, intoxication, heat stroke, anticholinergic syndromes, and spasticity from central nervous system lesions, though its role and efficacy remains uncertain.

METHODS

Seventy-two patients were treated with dantrolene and intravenous infusions of magnesium for 3 weeks and 3 community hospitals, over a period of 5 years (2007-2012). Demographic factors, practice, triggers, clinical presentations, management and clinical outcomes of patients treated with intravenous dantrolene were abstracted. Clinical parameters and laboratory values, both pre- and post-dantrolene administration were collected. Response of dantrolene was assessed in relation to lowering temperature, rigidity, and creatine kinase levels was assessed. Clinical outcomes also included length of ICU stay, morbidity and mortality in terms of life and renal failure, mortality.

RESULTS

Among 72 dantrolene-treated patients, 25 (59%) were treated with magnesium, 47 (67%) received oral dantrolene. Figure 1 details the indications of dantrolene use. Males (69%) dominated among the dantrolene-treated patients. Mean age was 46 years with a range between 10-82 years old. The median, mean, and range of temperature reported was 102.0°-102.7°F, and 100.5-109.0°F respectively. Dantrolene was used initially as a bolus of 1-1.5mg/kg body weight followed by an infusion, with a total of 4-4.5mg/kg. Dantrolene was used as a last resort in the treatment of most of these malignant hyperthermia-like syndromes and was found effective in lowering temperature, rigidity and CK levels in 18 of 25 patients, partially effective in 4 out of 25 patients. The length of ICU stay for the patients ranged between 3-18 days. 4 out of 25 patients suffered renal failure. Five patients did not improve survival in 4 sepsis, 2 DKA, and 2 septic/NSM cases, but was found to effectively reduce hyperthermia.

Figure 1: Indications of dantrolene use

Figure 2: Mortality in patients treated with intravenous dantrolene

CONCLUSION

Dantrolene is the mainstay treatment for malignant heat syndrome and is used with increasing frequency for the treatment of other malignant hyperthermia-like syndromes with good success. Dantrolene is inadvisable to suppress fever for patients with Neuroleptic malignant syndrome, cocaine intoxication, and sepsis patients with malignant hyperthermia, their actions only makes rigidity, hyperthermia, and rhabdomyolysis in these patients but offers survival benefits in patients with malignant hyperthermia. Dantrolene may have a role in improving survival in patients with septic shock with malignant hyperthermia, rhabdomyolysis, and diabetic ketoacidosis an improvement in its use, and needs further evaluation. Dantrolene appears to reduce complications in patients with extreme hyperthermia. Dantrolene has been shown to be associated with muscle weakness and atrophic, respiratory failure, renal and hepatic dysfunctions. In our study, we found that hepatic dysfunctions was the commonest complication found in temporal association with intravenous administration of dantrolene.

REFERENCES

1. Musumeci ME, Sweig S. Diagnosis and treatment of drug-induced Am J Health Syst Pharm. 2003 Jan 1; 59(1-2):