

Dantrolene Sodium in Neuroleptic Malignant Syndrome: Is There a Benefit?

Arthur W Daigh¹, Shawn M Varney¹, Meiqing Huang², Jonathan A Gelfond¹, Jeffrey Brent³, On Behalf of the ToxIC Investigators Consortium (ToxIC)

¹University of Texas Health - San Antonio, San Antonio, TX, USA.

²University of Connecticut, Storrs, CT, USA.

³University of Colorado School of Medicine, Denver, CO, USA

Background: Neuroleptic malignant syndrome (NMS) is a rare condition involving a tetrad of altered mental status, neuromuscular abnormalities, autonomic instability, and hyperthermia after exposure to dopamine antagonists or withdrawal from dopamine agonists. Treatment is stopping the causative agent, aggressive supportive care, and benzodiazepines. Dantrolene sodium, a musculoskeletal relaxant, is sometimes added, but the physiologic basis for its use is unclear. Our aim was to determine in patients with suspected NMS, if adding dantrolene to standard care (supportive care and benzodiazepines) improved clinical outcomes and to describe treatment and outcomes.

Methods: This is a secondary analysis of prospectively collected data of patients diagnosed with NMS recorded in the Toxicology Investigators Consortium Case Registry from the American College of Medical Toxicology from January 1, 2010, to May 31, 2019. We tested for associations with dantrolene administration and patient demographics, symptoms (mental status, neuromuscular, vital signs, and systemic), culprit medications, and other treatments. We created hierarchical clustering heat maps to describe symptom distribution among patients. Associations between categorical and continuous variables were tested using chi-squared and t tests, respectively.

Results: Of 131 patients diagnosed with NMS, 95 (72.5%) were 19–65 years old, and 80 (61.1%) were male. Seventeen (13%) were treated with dantrolene, 93 (71%) received benzodiazepines, and 31 (23.7%) bromocriptine. There was no association (NS) between dantrolene administration and specific organ system dysfunction, vital sign abnormalities, or any demographic characteristic. The heat map of nervous system symptoms (mental status/neuromuscular abnormalities) suggested three patient clusters corresponding to three levels of severity. Nineteen (14.5%) patients were intubated, one cardiac arrest, and zero deaths. Limitations included small sample size, misdiagnosis, and incomplete data on indications for and temporality of dantrolene administration.

Conclusion: We found no association between dantrolene administration and organ system findings in this NMS patient cohort.