

SUPPLEMENTAL DATA

Dantrolene use across surgical and medical care at Mayo Clinic from 2010 to 2024: Indications, frequency, and value for identifying malignant hyperthermia

**David Cho¹, Toby N. Weingarten², Juraj Sprung², Aurelia Zodl², Martin J. Ryll²,
Tracy E. Harrison^{2*}**

¹Mayo Clinic Alix School of Medicine, Rochester, Minnesota, USA;

²Department of Anesthesiology and Perioperative Medicine, Mayo Clinic College of Medicine and Science, Rochester, Minnesota, USA.

*Correspondence to Tracy E. Harrison: harrison.tracy@mayo.edu

Full article is available at the following link: [Dantrolene use across surgical and medical care at Mayo Clinic from 2010 to 2024: Indications, frequency, and value for identifying malignant hyperthermia](#)

Supplementary table 1. Hospitalized patients treated with intravenous dantrolene for neuroleptic malignant syndrome and other acute conditions excluding malignant hyperthermia

Age	Admission indication	Clinical course, therapies, outcomes	Diagnosis
Sex	Medications		
74 F	Hypotension Carbidopa/levodopa	Carbidopa/levodopa dose reduced in outside facility. Muscle rigidity, febrile (39.0°C), tachypnea. pH 7.45, PaCO ₂ 26 mmHg, BE -5 mmol/L, K 4.4 mmol/L. Dantrolene, hydration. CK _{max} 2,845 U/L. Full recovery.	NMS in setting of Parkinson's
61 F	Altered mental status Quetiapine, aripiprazole	Altered mental status, rigidity, hypertensive, tachycardiac, febrile (40.8°C), pH 7.43, PaCO ₂ 45 mmHg, BE +5 mmol/L, K 4.0 mmol/L. CK _{max} 1,337 U/L, urine myoglobin ≥ 5000 mcg/L. Dantrolene, diltiazem, lorazepam, hydration. Full recovery.	NMS in setting of bipolar disorder
56 F	Altered mental status Risperidone	Altered mental status, rigidity, tachycardia, hypertension. pH 7.53, PaCO ₂ 31 mmHg, BE +4, K 5.4 mmol/L. CK _{max} 77,770 U/L, urine positive for myoglobin. Afebrile. Dantrolene, bromocriptine, hydration. Full recovery.	NMS in setting of schizophrenia

43 M	Altered mental status Asenapine, lithium	Altered mental status, rigidity, somnolent, fever (39.5°C). pH 7.44, PaCO ₂ 41 mmHg, BE +4 mmol/L, K 3.6 mmol/L. CK _{max} 207 U/L. Dantrolene and ECT treatment for continuous catatonia. Discharged to nursing facility.	NMS in setting of schizophrenia
47 M	Delirium tremens Haloperidol, quetiapine	Rigidity and low-grade fevers following haloperidol and quetiapine administration for agitation. Dantrolene, bromocriptine. CK _{max} 492 U/L, K 4.2 mmol/L. Full recovery.	NMS secondary to treatment for agitation
51 F	Altered mental status, seizures Risperidone, mirtazapine, sumatriptan, tramadol, trazodone	Altered mental status, rigidity, psychogenic polydipsia, catatonia, fever (38.7°C). pH 7.39, PaCO ₂ 30 mmHg, BE -6 mmol/L, Na 102 mmol/L, K 3.3 mmol/L lactate 6.2 mmol/L, glucose 381 mg/dL, CK _{max} 2,139 U/L. Empirical dantrolene with improvement. Full recovery.	NMS secondary to antipsychotic medications.
56 M	Vertebroplasty Haloperidol, olanzapine	Hospital day 8 administered haloperidol and olanzapine for delirium. Developed rigidity, fever (39.1°C). pH 7.43, PaCO ₂ 35 mmHg, BE +2, K 4.3 mmol/L. Dantrolene, intubation and mechanical ventilation, antibiotics. CK _{max} 462 U/L. Died 18 days later of underlying disease and multi-	NMS secondary to treatment for agitation

organ failure.

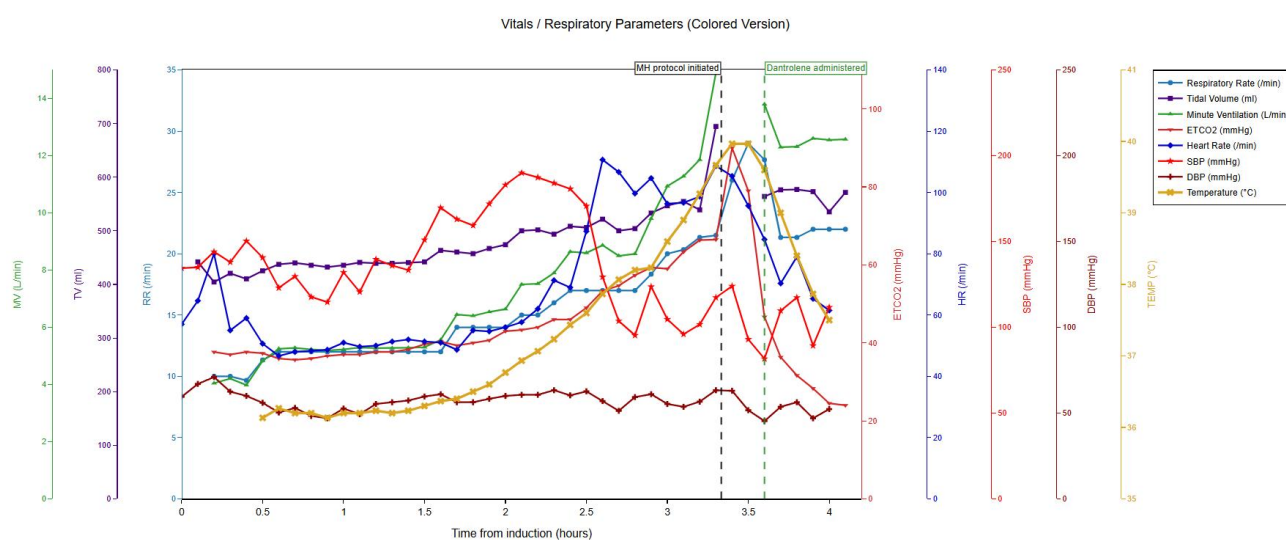
67 M	Cellulitis Haloperidol, quetiapine, fentanyl	Hospital day 13 developed altered mental status, rigidity, fever (39.6 °C) following haloperidol, quetiapine and fentanyl use. pH 7.47, PaCO ₂ 44 mmHg, BE +7, K 3.8 mmol/L, CK _{max} 1,893 U/L. Dantrolene, intubation, mechanical ventilation, antibiotics. Discharged to nursing facility after prolonged hospital course.	NMS secondary to antipsychotic medications
37 F	Altered mental status	Unresponsive, fever (41.5°C), pH 7.41, PaCO ₂ 34 mmHg, BE -3, K 2.8 mmol/L, CK _{max} 574 U/L. Empiric dantrolene and cyproheptadine for suspected NMS or serotonin syndrome until bacterial meningitis was diagnosed. Died hospital day 3 from meningitis.	Bacterial meningitis
44 M	Unresponsiveness secondary to overdose Unknown	Found unresponsive in the street with rhabdomyolysis (initial and max CK 16,406 U/L) from pressure ulcers. Hospital day 11 worsening mental status consistent with catatonia. Dantrolene administered to treat rigidity. Full recovery after prolonged hospitalization.	Rigidity in setting of catatonia

13 M	Trismus	Significant trismus. pH 7.47, PaCO ₂ 41 mmHg, BE +5, K 4.3 mmol/L, CK _{max} 31,600 U/L. Dantrolene for improving mouth opening and trismus. Full recovery.	Juvenile dermatomyositis leading to myopathy and rhabdomyolysis
24 F	Altered mental status	Altered mental status, tachycardia. pH 7.40, PaCO ₂ 44 mmHg, BE +3, K 4.6 mmol/L, CK _{max} 199 U/L. Dantrolene administered for episodes of dystonia. Full recovery.	Anti-NMDA receptor autoimmune encephalitis
63 M	Altered mental status, hypotension, hypothermia	Unresponsive, hypothermia (34.5°C), history of severe cerebral palsy with worsening spasticity and rigidity. pH 7.14, PaCO ₂ 83 mmHg, BE -2, K 4.8 mmol/L. Chronic oral dantrolene substituted to IV during hospital stay. Died after prolonged hospital course.	Sepsis from pneumonia
19 M	Polytrauma	Patient hospitalized after polytrauma in the ICU. He developed central fever secondary to severe neurologic injury which was treated with bromocriptine. During week 3 of ICU admission, he developed ileus and IV dantrolene was substituted for bromocriptine for 3 days with resolution of fever. Discharged alive with severe neurologic brain	Central fever secondary to polytrauma and neurologic injury

injury.

Abbreviations: EtCO₂: End-tidal carbon dioxide; BE: Base excess; CK_{max}: Maximum creatine kinase; NMS: Neuroleptic malignant syndrome; ICU: Intensive care unit.

Reference values: CK, reference, 39-308 U/L; ALT, reference, 7-55 U/L; AST, reference, 8-48 U/L; Urine myoglobin, reference, £65 mg/L. IV, intravenous.



Supplementary figure 1. This interactive figure is an enhanced version of Figure 1, enabling both individual and cumulative comparisons of intraoperative trends in temperature, respiratory, and hemodynamic parameters. Users can examine and compare the dynamics of specific variables by selecting them from the figure legend. The interactive figure is available at:

<https://www.bjbm.org/ojs/index.php/bjbm/article/view/13340/4045>.