

Neuroleptic Malignant Syndrome

A plain-English guide for you and your family

WHAT IS HAPPENING

Healthy brain: balanced neurotransmitter tone keeps mood, thinking, seeing, and actions in range. Hold this picture. Every bad finding makes sense as a break from it. The mechanism explains the symptoms. But biology alone does not predict outcome. Each social factor amplifies or buffers the same circuit. Treat both or treat neither. Body response — what you actually see at the bedside: Stiff muscles like lead pipes, not shaking in legs. Fever over 40°C. Confused. Wild body signs. Cannot speak. It builds up over days, not hours. None of this is random; each finding is the system trying to defend mood, cognition, or perception while the upstream circuit struggles.

What you might feel

- Very stiff muscles all over the body (lead-pipe rigidity)
- High fever (often 102–106 °F)
- Confusion or can't think clearly (altered mental status)
- Fast heart rate and blood pressure swings (autonomic instability)
- Very high creatine kinase (CK) in the blood
- Sweating heavily
- Trouble swallowing or drooling
- Tremor or slight shaking

Call the doctor right away if...

- Fever above 104 °F — can cause seizures, brain damage, or death if not cooled quickly
- Very confused, sleepy, or unresponsive — means the brain is in danger
- Dark brown urine (from muscle breakdown) — can clog and destroy the kidneys
- Trouble breathing or chest pain — heart or lungs may be failing
- Blood pressure or heart rate all over the map — autonomic system is crashing

What the care team will do

- Stop the antipsychotic drug immediately and hold all dopamine-blocking medicines including metoclopramide, prochlorperazine, and promethazine
- Start aggressive cooling with ice packs to the groin, armpits, and neck; use cooling blankets; and infuse cold intravenous normal saline to bring core temperature below 101 °F within 30 minutes
- Give rapid intravenous normal saline boluses at 200 to 300 mL per hour, aiming for urine output above 200 mL per hour
- Monitor vital signs every 15 minutes and watch for blood pressure swings, irregular heart rhythms, and breathing rate above 24 or below 10 per minute
- Check creatine kinase level immediately and repeat every 6 hours; watch for CK above 1000 U per L
- Measure urine color and test for myoglobin every 2 hours; notify the provider immediately if urine turns dark brown or red
- Monitor serum potassium and calcium every 4 hours and place the patient on continuous cardiac telemetry monitoring
- Assess mental status using the Glasgow Coma Scale every hour and immediately report a score below 13 or any new confusion, seizure activity, or unresponsiveness

Medicines you may be given — and why

Immediate discontinuation of the causative antipsychotic or dopamine-blocking agent

Stop the medicine that triggered the syndrome. Antipsychotic drugs block dopamine D2 receptors in the brain's movement and temperature centers. When these receptors stay blocked too long or too hard, the brain loses its ability to regulate muscle tension and body heat. Removing the drug allows dopamine signaling to slowly recover and the brain's thermostat and movement circuits to reset.

Aggressive cooling measures and intravenous fluids

The body's core temperature is dangerously high, and muscles are breaking down, releasing myoglobin (a muscle protein) into the blood that can clog the kidneys. Cooling the body with ice packs, cooling blankets, or cold IV fluids brings the temperature down directly. Large volumes of IV saline flush myoglobin through the kidneys before it can cause damage, and replace fluid lost through sweating and fever.

Bromocriptine

Bromocriptine mimics dopamine and directly stimulates D2 dopamine receptors that the antipsychotic drug had been blocking. By turning these receptors back on, it restores signaling in the brain's movement and temperature centers, easing rigidity and helping the hypothalamus lower body temperature. It acts as a stand-in for dopamine until the body's own system can recover.

Dantrolene

Dantrolene works directly on muscle cells, not the brain. It blocks ryanodine receptors inside muscle fibers, which are the gates that release calcium from storage. Without that calcium flood, muscle fibers cannot contract as forcefully. This reduces the life-threatening rigidity and heat production caused by constant muscle contraction, giving the body time to cool and preventing further muscle breakdown.

Electroconvulsive therapy (ECT)

ECT delivers a controlled electrical pulse to the brain under anesthesia, triggering a brief seizure. This seizure activity resets abnormal brain circuits and rapidly increases dopamine and other neurotransmitter levels. In neuroleptic malignant syndrome, ECT can break the cycle of rigidity, fever, and autonomic instability when medications have failed or cannot be used. The exact mechanism is not fully understood, but ECT is thought to restore balance to the brain's dopamine and serotonin systems and reboot the hypothalamus.

Benzodiazepines (e.g., lorazepam, diazepam)

Benzodiazepines boost the action of GABA (the brain's main calming signal) by making GABA-A receptors more sensitive. This reduces overall brain excitability, calms agitation, and provides some muscle relaxation. In neuroleptic malignant syndrome, they help manage severe agitation and autonomic instability (wild swings in heart rate and blood pressure) while other treatments take effect. They do NOT fix the dopamine blockade but offer supportive symptom control.

Where this information comes from

- American Psychiatric Association (APA) Practice Guideline 2020
- Neurocritical Care Society
- UpToDate / BMJ Best Practice
- Critical Care Medicine 2018 review

Last reviewed: 2026-07-07