

Mg (magnesium) disorders

A plain-English guide for you and your family

WHAT IS HAPPENING

Magnesium is a quiet helper inside every cell. It steadies the electrical gates on cell walls so nerves and muscles fire smoothly, helps hundreds of enzymes (tiny workers) run the body's chemistry, and keeps potassium and calcium balanced. When magnesium runs low—from water pills (diuretics), heavy alcohol use, acid-blocking medicines (PPIs), or long diarrhea—the body loses its grip on potassium and calcium too, so even when doctors replace potassium through an IV, it keeps leaking out until magnesium is fixed first. Low magnesium makes muscles twitch and cramp, the heart can slip into a dangerous spinning rhythm called torsades, and you might feel shaky or stiff. When magnesium climbs too high—usually from getting too much magnesium sulfate for pregnancy seizures (eclampsia) while the kidneys are failing—it clamps down on nerves and muscles so hard that everything goes floppy: muscles weaken, reflexes vanish, blood pressure drops, and breathing slows because even the diaphragm won't squeeze. None of this is random; every symptom traces back to magnesium's job controlling the electrical and chemical balance in cells.

What you might feel

- Muscle twitches or cramps that won't let up
- Numbness or tingling around the mouth or in the hands and feet
- Heart racing or skipping beats (palpitations)
- Seizure or whole-body shaking you can't control
- Feeling weak all over or trouble moving
- Nausea, throwing up, or losing your appetite
- Confusion or trouble thinking clearly
- Taking medicines like proton-pump inhibitors (PPIs for heartburn), diuretics (water pills), or drinking a lot of alcohol
- Long-lasting diarrhea or a bowel condition like Crohn disease
- Kidney disease or taking magnesium-containing antacids or laxatives often

Call the doctor right away if...

- Heart rhythm suddenly turns very slow, very fast, or chaotic (arrhythmia) on the monitor
- Seizure or uncontrollable shaking
- Muscles so weak the person can't breathe deeply or move at all
- Confusion that gets worse quickly or the person becomes hard to wake up

What the care team will do

- Place patient on continuous cardiac monitor and obtain a 12-lead EKG immediately
- Establish IV access and prepare to give IV magnesium sulfate 1 to 2 grams over 1 hour
- Check potassium and calcium levels and prepare to replace both after magnesium is corrected
- Assess deep tendon reflexes every 15 to 30 minutes during IV magnesium infusion
- Monitor respiratory rate and oxygen saturation closely during magnesium replacement
- Review the medication list with the provider and discuss stopping or reducing diuretics and PPIs
- Assess for signs of tetany like Chvostek sign (facial twitching when you tap the cheek) or Trousseau sign (hand spasm when you inflate a blood pressure cuff)
- For high magnesium with symptoms, prepare IV calcium gluconate 1 to 2 grams and stop all magnesium sources immediately

Medicines you may be given — and why

Magnesium sulfate (IV)

Delivers magnesium straight into the bloodstream so cells can quickly refill their magnesium stores, steadying the electrical charges on nerve and muscle membranes and restarting hundreds of enzyme jobs that depend on magnesium.

Magnesium oxide or magnesium chloride (oral)

Delivers magnesium through the gut so the small intestine can absorb it into the blood, gradually refilling the body's magnesium stores when the deficit is mild and the gut works well.

Potassium chloride (oral or IV)

Replaces potassium in the blood and cells. Low magnesium keeps the kidneys from holding onto potassium, so you must fix magnesium first or the potassium will keep leaking out and the level will not rise.

Calcium gluconate (IV)

Raises blood calcium to stop dangerous muscle spasms (including the airway and heart) caused by low calcium, which often drops when magnesium is low because the parathyroid gland needs magnesium to release PTH (the hormone that pulls calcium from bone and tells the kidney to hold onto it).

Amiloride

Blocks sodium channels in the kidney's collecting duct so less sodium is pulled back into the blood, which indirectly keeps the kidney from dumping magnesium and potassium into the urine. Used when a genetic defect or a loop/thiazide diuretic is causing magnesium wasting.

Loop diuretic (furosemide) and IV saline (for severe hypermagnesemia)

Furosemide forces the kidney to dump sodium, water, and magnesium into the urine, lowering blood magnesium quickly. IV saline expands blood volume so the kidney can filter and excrete magnesium faster. Used only when magnesium is dangerously high (usually above 4 mEq/L with symptoms).

Calcium gluconate (IV, for severe hypermagnesemia)

Quickly reverses the dangerous effects of very high magnesium on the heart and breathing muscles by flooding receptors and channels with calcium, which competes with magnesium and restores normal muscle and nerve excitability. This is an emergency rescue, not a way to lower magnesium itself.

Hemodialysis (for life-threatening hypermagnesemia with kidney failure)

A machine filters the patient's blood through a membrane that removes magnesium, potassium, and other waste while returning clean blood to the body. This is the only reliable way to lower magnesium quickly when the kidneys cannot clear it themselves.

Where this information comes from

- NEJM Clinical Practice review on magnesium disorders
- American Society of Nephrology (ASN) electrolyte guidelines
- UpToDate clinical reference on hypomagnesemia and hypermagnesemia
- Cochrane reviews on electrolyte replacement

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