NGN NCLEX 2026 • NEUROLOGICAL PHARMACOLOGY

Myasthenia Gravis *vs* Cholinergic Crisis

Two crises. Same diagnosis. Opposite causes. Opposite treatments.

NEUROMUSCULAR | PRIORITY: AIRWAY | HIGH-YIELD

1 Definition & Overview

Myasthenia Gravis (MG): A chronic autoimmune disorder where antibodies destroy acetylcholine (ACh) receptors at the neuromuscular junction → muscle weakness & fatigability.

Myasthenic Crisis: Sudden, severe worsening of MG → life-threatening respiratory muscle weakness. Caused by *too little* medication, infection, stress, or surgery.

Cholinergic Crisis: Medical emergency from *too much* anticholinesterase medication → acetylcholine overdose → SLUDGE + respiratory failure.

💡 **Why it matters:** Both crises cause respiratory failure & look similar, but the treatments are *polar opposites*. Missing the difference can kill the patient.

2 Pathophysiology (Simplified)

🔵 MYASTHENIC CRISIS — "Not Enough"

Autoimmune antibodies → Destroy ACh receptors → ↓ ACh activity at NMJ → **Muscle weakness + respiratory failure**

Trigger: Under-medication • Infection • Stress • Surgery • Missed dose

CHOLINERGIC CRISIS — "Too Much"

Excess anticholinesterase drug → ACh accumulates at NMJ → Over-stimulation of receptors → **SLUDGE + paralysis + respiratory failure**

Trigger: Overdose of Mestinon/neostigmine • Patient self-medicates

3 Signs & Symptoms — Side-by-Side

Myasthenic Crisis — UNDER-DOSE

CAUSE

Too **little** anticholinesterase · Missed dose · Infection · Stress

CLASSIC SIGNS

- **Ptosis** (drooping eyelids) — often first sign
- **Diplopia** (double vision)
- Severe **muscle weakness** — worsens with activity
- Dysphagia (difficulty swallowing)
- Dysarthria (slurred speech)
- Weak cough, shallow breathing

RED FLAGS

- Respiratory muscle weakness
- Inability to clear secretions
- Rising CO_2, falling SpO_2
- **Absent** SLUDGE symptoms

Cholinergic Crisis — OVER-DOSE

CAUSE

Too **much** anticholinesterase · Mestinon/neostigmine overdose · Organophosphate poisoning

CLASSIC SIGNS — "SLUDGE"

- **S**alivation (excessive drooling)
- **L**acrimation (tearing)
- **U**rinary incontinence
- **D**iarrhea, abdominal cramping
- **G**I upset, nausea/vomiting
- **E**mesis + **E**xcessive sweating

RED FLAGS

- **Bradycardia** + hypotension
- **Bronchospasm** + wheezing
- Muscle fasciculations (twitching)

PUPILS & SKIN

- Pupils: **normal or dilated**
- Skin: dry, pale

▲ Respiratory paralysis

PUPILS & SKIN

▲ Pupils: **miosis** (pinpoint)

▲ Skin: wet, sweaty, flushed

🧠 SLUDGE-M — Cholinergic Crisis Mnemonic

When you see ALL of these together → CHOLINERGIC crisis → give ATROPINE

S	L	U	D	G	E	M
Salivation	Lacrimation	Urination	Defecation	GI Upset	Emesis	Miosis

🧪 The Tensilon (Edrophonium) Test — Differentiates the Crisis

IV edrophonium briefly boosts ACh. The response reveals the diagnosis.

⬆️

Symptoms IMPROVE

→ **Myasthenic Crisis**

Patient needs **more** anticholinesterase

⬇️

Symptoms WORSEN

→ **Cholinergic Crisis**

Patient needs **atropine** immediately

⚠️ *Keep **atropine** at bedside during the Tensilon test — it is the antidote if a cholinergic reaction occurs.*

4 Priority Nursing Interventions

🚨 **FIRST PRIORITY (BOTH CRISES):**

Airway • Breathing • Circulation. Prepare for intubation/mechanical ventilation. Suction at bedside. Call rapid response.

Myasthenic Crisis A-B-C

- → **Assess** respiratory status q15 min — vital capacity, SpO_2, ABGs
- → **Position** high-Fowler's to maximize ventilation
- → **Administer** prescribed anticholinesterase (neostigmine, pyridostigmine) on schedule
- → **Suction** airway — patient cannot clear secretions
- → **Prepare** for intubation & mechanical ventilation
- → **Plasmapheresis** or IVIG may be ordered to remove antibodies
- → **NPO** if dysphagia present — aspiration precautions

Cholinergic Crisis A-B-C

- → **Stop / hold** all anticholinesterase medications immediately
- → **Administer ATROPINE** IV — the *antidote* (dries up secretions, raises HR)
- → **Suction** aggressively — risk of drowning in secretions
- → **Monitor** HR for bradycardia, BP for hypotension
- → **Prepare** for intubation & mechanical ventilation
- → **Cardiac monitoring** continuous — risk of arrhythmias
- → **Protect airway** — side-lying if vomiting

5 Pharmacology

DRUG / CLASS	MECHANISM	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Pyridostigmine (Mestinon) — 1st line MG	Anticholinesterase — ↑ ACh at NMJ	SLUDGE, muscle cramps, bradycardia	Give **on time** — late dose = myasthenic crisis; give **30 min before meals** to aid swallowing
Neostigmine (Prostigmin)	Short-acting anticholinesterase	SLUDGE, bronchospasm, bradycardia	IM/IV in acute crisis; monitor respiratory status closely
Edrophonium (Tensilon)	Ultra-short anticholinesterase (diagnostic)	Can precipitate cholinergic crisis	Diagnostic tool only; **atropine at bedside**
ATROPINE ANTIDOTE for cholinergic crisis	Anticholinergic — blocks muscarinic receptors → opposes ACh	Dry mouth, tachycardia, urinary retention, mydriasis	**DRUG OF CHOICE for cholinergic crisis.** Keep at bedside during Tensilon test. Dries secretions, reverses bradycardia.
Corticosteroids (Prednisone)	Immunosuppression — ↓ antibody production	Hyperglycemia, weight gain, infection risk	Long-term MG management; taper — never stop abruptly
Immunosuppressants (Azathioprine, Cyclosporine)	Suppress autoimmune response	Bone marrow suppression, infection	Monitor CBC; teach infection prevention

⚠️ Medications to AVOID in Myasthenia Gravis

These drugs worsen muscle weakness and can precipitate crisis: **Aminoglycosides** (gentamicin, neomycin) • **Beta-blockers** • **Quinine/Quinidine** • **Magnesium** (especially IV) • **Neuromuscular blockers** • **Certain anesthetics** • **Macrolides** (erythromycin) • **Fluoroquinolones** (ciprofloxacin)

6 Complications & Management

Respiratory Failure

Most common cause of death. Monitor **vital capacity** & ABGs. Intubation if VC < 15 mL/kg or rising CO_2.

Aspiration Pneumonia

Dysphagia & weak cough. Keep NPO until swallow evaluation. HOB elevated. Suction ready.

Secretion Overload

Especially cholinergic crisis. Aggressive suctioning. Atropine dries secretions.

Cardiac Arrhythmias

Bradycardia in cholinergic crisis. Continuous ECG. Atropine for symptomatic bradycardia.

Plasmapheresis / IVIG

Removes/neutralizes antibodies for severe myasthenic crisis. Monitor for hypotension & infection.

Thymectomy

Surgical removal of thymus — may induce remission. Pre-op: avoid contraindicated meds. Post-op: watch for crisis.

7 NCLEX Test Traps ⚠️

TRAP #1 — THE "SAME SYMPTOM" TRICK

Both crises cause **muscle weakness and respiratory failure**. Students pick the wrong one. **Solution:** Look for SLUDGE symptoms (cholinergic) or absence of SLUDGE (myasthenic).

TRAP #2 — "GIVE MORE MESTINON"

If a question describes a patient on Mestinon with **drooling, diarrhea, and bradycardia**, do **NOT** give more Mestinon — that's cholinergic crisis. Answer: **atropine**.

TRAP #3 — TIMING OF MEDICATIONS

Pyridostigmine must be given **on time** — even a 30-minute delay can trigger myasthenic crisis. Also give **30 minutes before meals** to strengthen swallowing.

TRAP #4 — TENSILON TEST RESPONSE

Improvement = Myasthenic (needs more drug). **Worsening = Cholinergic** (needs atropine). Memorize this — it's a guaranteed NCLEX question.

TRAP #5 — PRIORITY: AIRWAY ALWAYS

Regardless of which crisis — the FIRST nursing action is always **airway management & prep for intubation**, not administering a specific drug. ABCs beat pharmacology.

TRAP #6 — CONTRAINDICATED DRUGS

Watch for NCLEX questions where MG patient is prescribed **gentamicin, magnesium, or a beta-blocker** — your answer is to **question the order**. These worsen weakness.

8 Patient Education

Medication Management

- ✓ Take anticholinesterase **exactly on schedule**
- ✓ Take **30 min before meals** to aid swallowing
- ✓ Wear a **medical alert bracelet**
- ✓ Never stop steroids abruptly — taper only
- ✓ Keep a medication log

Energy Conservation

- ✓ Rest periods throughout the day
- ✓ Schedule activities **early** (strongest then)
- ✓ Avoid overheating, hot showers, saunas
- ✓ Sit to perform tasks when possible
- ✓ Cluster care to allow rest

When to Call 911

- ✓ Difficulty breathing or swallowing
- ✓ Sudden severe weakness
- ✓ Drooling + diarrhea + cramping (cholinergic)
- ✓ Choking on food or saliva

Avoid These Triggers

- ✓ Emotional & physical stress
- ✓ Infections (get flu shot, pneumococcal)
- ✓ Contraindicated drugs (show med list to HCP)
- ✓ Overexertion & heat exposure

- ✓ Signs of infection (can trigger crisis)
- ✓ Pregnancy risks — discuss with provider

9 NCJMM Clinical Judgment Framework

Applying the NGN Clinical Judgment Measurement Model

RECOGNIZE → ANALYZE → PRIORITIZE → EVALUATE

🔍 RECOGNIZE
Identify cues: ptosis, dysphagia, weak cough, SLUDGE symptoms, pinpoint pupils, respiratory distress, timing of last medication.

🧠 ANALYZE
Differentiate: SLUDGE present = cholinergic. SLUDGE absent + infection/missed dose = myasthenic. Consider Tensilon response.

⚡ PRIORITIZE
ABCs first. Maintain airway, prep for intubation. Give atropine (cholinergic) OR anticholinesterase (myasthenic). Suction.

✅ EVALUATE
Respiratory improvement, SpO_2 rising, secretions decreased, muscle strength return, HR stable, no recurrence of crisis.

10 Memory Boosters & Mnemonics

🧠 "SLUDGE-M" → Cholinergic Crisis

Salivation **L**acrimation **U**rination **D**efecation **G**I upset **E**mesis **M**iosis

Translation: The patient is "wet everywhere" — wet eyes, wet mouth, wet pants, wet lungs. Give ATROPINE to "dry them out."

🔑 "MORE vs LESS" Rule

Myasthenic = Need **M**ore medicine (under-dosed) → give anticholinesterase
Cholinergic = **C**ut it off (over-dosed) → give atropine

👁️ Pupil Check — Quick Differentiator

Miosis (pinpoint) = Cholinergic ("M" for Much ACh)

Normal/dilated = Myasthenic (low ACh)

💊 "Mestinon Before Meals"

Give pyridostigmine (**M** estinon) **30 minutes before Meals** so the patient is strong enough to **M**asticate & swallow safely.

🚫 "MG Drug Avoid List" → Think "AABMNQ"

A minoglycosides **A** nesthetics **B** eta-blockers **M** agnesium **N** euromuscular blockers **Q** uinine

These all worsen muscle weakness → precipitate crisis.

⏱️ Tensilon Test Outcome

Tensilon Test: Think "T" = **T**ells you which crisis

👍 Better = Myasthenic (give more)

👎 Worse = Cholinergic (atropine NOW)