



NCLEX PHARMACOLOGY INFOGRAPHIC

CHOLINESTERASE INHIBITORS & NMDA ANTAGONISTS

Drug Classes: AChE Inhibitors | NMDA Receptor Antagonist

System: Neurologic | Use: Alzheimer's Disease / Dementia



★. MOST TESTED DRUGS IN THIS CLASS

DRUG	CLASS	INDICATION	KEY POINT
Donepezil (Aricept)	AChE inhibitor	Mild → Severe AD	Once daily at HS; vivid dreams → give AM
Rivastigmine (Exelon)	AChE + BChE inhibitor	AD + Parkinson's dementia	PATCH available — remove OLD before applying new!
Galantamine (Razadyne)	AChE inhibitor + nicotinic modulator	Mild → Moderate AD	Take with food (AM & PM)
Memantine (Namenda)	NMDA receptor antagonist	Moderate → Severe AD	Often COMBINED with donepezil; renal dose adjust



1. DRUG OVERVIEW

KEY INDICATIONS — Why we give it:

- Alzheimer's disease (primary indication)
- Vascular & mixed dementia
- Parkinson's disease dementia (rivastigmine only)
- Lewy body dementia (rivastigmine, donepezil)

HIGH-YIELD CLINICAL USE:

- **GOAL:** SLOW progression — NOT curative
- Improves cognition, memory, ADLs, and behavior temporarily
- AChE inhibitors → early-to-moderate AD
- Memantine → moderate-to-severe AD
- Combo therapy (donepezil + memantine) common in advanced AD



2. MECHANISM OF ACTION (SIMPLIFIED)



AChE INHIBITORS

(Donepezil, Rivastigmine, Galantamine)

- Block acetylcholinesterase enzyme
- → ↓ breakdown of acetylcholine (ACh)
- → ↑ ACh at cholinergic synapses
- → ↑ cognition, memory, attention

"More ACh = More Cognition"

NMDA ANTAGONIST

(Memantine)

- Blocks NMDA glutamate receptors
- → ↓ excess glutamate binding
- → ↓ calcium influx into neurons
- → ↓ excitotoxicity & neuron death
- → NEUROPROTECTION

"Calms over-excited neurons"

3. THERAPEUTIC EFFECTS

What improvement should be seen?

- Improved cognition (↑ MMSE / MoCA scores)
- Better memory & attention
- Improved performance of ADLs
- Reduced confusion & agitation
- Improved mood & behavior
- Delayed need for long-term care placement

What tells you it's WORKING?

- **Baseline + q3–6 months:** MMSE/MoCA stable or ↑ by 2–4 points
- Caregiver reports slower decline
- Patient maintains daily function longer
- **REMEMBER:** Disease still progresses — success = SLOWER decline

4. SIDE EFFECTS & ADVERSE REACTIONS

AChE INHIBITORS

COMMON (Cholinergic — SLUDGE)

- Nausea, vomiting, diarrhea
- Salivation, lacrimation
- Urinary urgency / incontinence
- Anorexia & weight loss
- Dizziness, headache, fatigue

MEMANTINE

COMMON

- Dizziness, headache
- Confusion, agitation
- Constipation (NOT diarrhea!)
- Hypertension (NOT hypotension!)
- Fatigue, somnolence

- Vivid dreams / insomnia (donepezil)
- Muscle cramps

🚨 **SERIOUS / LIFE-THREATENING**

- Bradycardia / syncope / AV block
- Hypotension → falls
- Bronchospasm (asthma/COPD risk)
- GI bleeding / peptic ulcers
- Seizures
- Cholinergic crisis (overdose)

- Back pain
- Generally **BETTER TOLERATED** than AChE inhibitors

🚨 **SERIOUS / LIFE-THREATENING**

- Seizures (rare)
- Severe confusion / psychosis
- Stevens-Johnson syndrome (rare)
- Renal toxicity w/ dose stacking
- Hypertensive crisis (rare)

5. PRIORITY NURSING CONSIDERATIONS

→ **ASSESS / MONITOR:**

- Baseline HR, BP, ECG (AChE inhibitors can cause bradycardia)
- Respiratory status (bronchospasm risk in asthma/COPD)
- GI function — N/V, diarrhea, black stools, weight
- Cognitive status (MMSE/MoCA) q3–6 months
- Renal function (BUN/Cr) — **ESPECIALLY** for memantine
- Fall risk — orthostatic BP in elderly

→ **HOLD THE DRUG IF:**

- **HR < 60 bpm** → hold AChE inhibitor, notify provider
- Symptomatic bradycardia, syncope, or new AV block
- Active GI bleeding or severe N/V
- Severe renal impairment (memantine — dose adjust)
- Recent MI or unstable cardiac status

→ **CONTRAINDICATIONS:**

- AChE inhibitors: sick sinus syndrome, AV block (2°/3°)
- Severe asthma / COPD (relative)
- Active peptic ulcer disease / GI bleed
- Seizure disorder (caution)
- Urinary tract obstruction

→ **DRUG INTERACTIONS:**

- **Beta-blockers / digoxin** → additive bradycardia (HIGH YIELD)
- **NSAIDs** → ↑ GI bleed risk with AChE inhibitors
- **Anticholinergics (diphenhydramine, oxybutynin)** → **ANTAGONIZE** therapy
- **Succinylcholine** → prolonged neuromuscular blockade
- **Sodium bicarbonate** → ↑ memantine levels (alkaline urine)

- **Amantadine / ketamine / dextromethorphan** → avoid with memantine (NMDA stacking)

→ **NOTIFY PROVIDER FOR:**

- HR < 60, syncope, dizziness with standing
- Black/tarry stools, coffee-ground emesis
- Wheezing or new respiratory symptoms
- New-onset seizure activity
- Severe confusion or hallucinations

6. LABS & DIAGNOSTICS

KEY LABS TO MONITOR:

- **BUN / Creatinine / GFR:** especially memantine (renally excreted)
- **LFTs (AST/ALT):** baseline + periodic (rivastigmine)
- **CBC:** screen for GI bleed-related anemia
- **Electrolytes:** K⁺, Na⁺ (especially with diuretics)
- **ECG (12-lead):** baseline for AChE inhibitors — assess PR interval
- **Weight:** q visit — weight loss is common

COGNITIVE ASSESSMENTS:

- **MMSE:** Mini Mental State Exam (0–30); <24 = cognitive impairment
- **MoCA:** Montreal Cognitive Assessment (0–30); <26 = impairment
- Obtain at BASELINE + every 3–6 months

CRITICAL VALUES / RED FLAGS 🚩

- HR < 60 bpm → HOLD AChE inhibitor
- CrCl < 30 mL/min → reduce memantine dose
- ↓ Hgb / ↓ Hct → possible GI bleed
- ↑ LFTs > 3× normal → hepatotoxicity
- MMSE drops > 4 points in 6 months → therapy failure

7. ADMINISTRATION & SAFETY

DOSING & TIMING:

- **Donepezil:** PO once daily at BEDTIME (switch to AM if vivid dreams)
- **Rivastigmine PO:** BID with FOOD (reduces GI upset)
- **Rivastigmine PATCH:** apply once daily; rotate sites; back/chest/upper arm

- **Galantamine:** PO BID with FOOD (AM and PM)
- **Memantine:** PO once or twice daily; can take with or without food



HIGH-ALERT: RIVASTIGMINE PATCH

- "PULL BEFORE PUT" — ALWAYS remove OLD patch BEFORE applying new
- Two patches on simultaneously = cholinergic crisis risk
- Rotate application sites (do not use same site for 14 days)
- Do not cut or apply to irritated skin
- Wash hands after application

TITRATION RULE:

- **"START LOW, GO SLOW"** — titrate every 4 weeks minimum to reduce GI side effects
- Memantine: start 5 mg daily, ↑ weekly to target 10 mg BID
- Never double-dose if a dose is missed — just take next scheduled dose

SPECIAL POPULATIONS:

- Renal impairment → reduce memantine dose
- Hepatic impairment → caution with rivastigmine & galantamine
- Low body weight (<55 kg) → ↑ risk of cholinergic side effects



8. PATIENT & CAREGIVER EDUCATION

WHAT THE PATIENT / CAREGIVER MUST KNOW:

- **THIS IS NOT A CURE** — it slows decline, does not reverse dementia
- Take at the same time every day
- Do NOT stop abruptly → rapid cognitive decline
- Take with food (rivastigmine, galantamine) to reduce nausea
- Avoid OTC sleep aids & allergy meds (anticholinergics antagonize therapy)
- Rise slowly from sitting/lying → prevent falls

WHEN TO SEEK HELP — CALL PROVIDER IF:

- Fainting, dizziness, slow heartbeat
- Black/tarry stools or vomiting blood
- Severe or persistent nausea/vomiting (dehydration)
- Wheezing or trouble breathing
- New seizure, extreme confusion, hallucinations
- Unintended weight loss

SAFETY TEACHING:

- Medication storage — LOCK up (confused patient safety)
- Medical alert bracelet identifying dementia dx & medications
- Fall-proof the home (remove rugs, add grab bars)

- Caregiver resources: Alzheimer's Association (1-800-272-3900)
- Advance directives — discuss while patient has capacity
- Do NOT drive if impaired cognition/dizziness
- Rivastigmine patch: apply only ONE; remove old patch FIRST

9. NCLEX TEST TRAPS ⚠️

⚠️ COMMON MISTAKES & TRAP QUESTIONS:

- **TRAP #1:** "Does this cure Alzheimer's?" → NO. It only SLOWS progression.
- **TRAP #2:** AChE inhibitors = CHOLINERGIC effects (SLUDGE), NOT anticholinergic. Confusing the two = wrong answer.
- **TRAP #3:** Bradycardia is a HOLD parameter — NOT just an expected side effect. HR < 60 = hold + notify.
- **TRAP #4:** Diphenhydramine (Benadryl), oxybutynin, and TCAs = anticholinergics → they ANTAGONIZE donepezil. Do NOT give together.
- **TRAP #5:** "Patient has 2 rivastigmine patches on" → REMOVE OLD PATCH FIRST. Double patch = cholinergic crisis.
- **TRAP #6:** MEMANTINE ≠ AChE inhibitor. Different mechanism (NMDA). Does NOT cause SLUDGE or bradycardia.
- **TRAP #7:** Memantine causes HYPERTENSION & CONSTIPATION — opposite of AChE inhibitors (hypotension & diarrhea).
- **TRAP #8:** Abrupt discontinuation = RAPID cognitive decline. Never stop without provider order.
- **TRAP #9:** These drugs are for DEMENTIA — not depression, psychosis, or ADHD.
- **TRAP #10:** Cholinergic crisis antidote = ATROPINE. If patient on donepezil has severe SLUDGE symptoms → atropine, not more donepezil.

PRIORITY vs NON-PRIORITY:

- **PRIORITY:** HR < 60, syncope, GI bleed, respiratory distress, cholinergic crisis
- **NON-PRIORITY:** Mild nausea, transient dizziness on initiation, vivid dreams

10. MEMORY BOOSTERS / MNEMONICS

🔑 "SLUDGE" — Cholinergic Side Effects

- S — Salivation
- L — Lacrimation
- U — Urinary incontinence
- D — Diarrhea

- G – GI upset (cramps)
- E – Emesis (vomiting)

🔑 DRUG NAME TRICKS

- **"-STIGMINE"** = cholinesterase inhibitor (rivastigmine, neostigmine)
- **"DONEPEZIL"** = "DONE with forgetting" → for Alzheimer's
- **"MEMANTINE"** = "MEMORY" — MEMory-ANTI(age)-INE
- **"GALANTAMINE"** = "GALA for the brain" — celebrates neurons

🔑 KEY RULES TO MEMORIZE

- "START LOW, GO SLOW" — titrate slowly to reduce GI SE
- "PULL BEFORE PUT" — old patch off BEFORE new patch on
- "ACh UP = HR DOWN" — ↑ ACh slows heart (bradycardia)
- "ACh UP = Cognition UP" — more ACh = better memory
- "3 DRGs + 1 MEM" — 3 AChE inhibitors (Donepezil, Rivastigmine, Galantamine) + 1 NMDA (Memantine)

🔑 OPPOSITE-OF-EACH-OTHER

- **AChE inhibitors:** DIARRHEA, HYPOTension, BRADYcardia
- **Memantine:** CONSTIPATION, HYPERTension, (no bradycardia)

🔑 ANTIDOTE

- **Cholinergic crisis** = ATROPINE ("AT" the rescue)



CLINICAL JUDGMENT SNAPSHOT



NCJMM — Prioritize Like the NCLEX

Q1: What is the #1 PRIORITY RISK?

→ **BRADYCARDIA & SYNCOPES** from AChE inhibitors → risk of falls, AV block, cardiac arrest

Q2: What will HARM the patient FIRST?

→ **FALLS** from syncope/dizziness in an elderly, cognitively impaired patient — leading to hip fracture, head injury, or death

Q3: What is the FIRST NURSING ACTION?

→ Scenario: HR < 60 or syncope → **HOLD drug + notify provider**

→ Scenario: Cholinergic crisis (severe SLUDGE, bradycardia, bronchospasm) → **give ATROPINE (antidote)**

→ Scenario: 2 rivastigmine patches on → **REMOVE OLD PATCH FIRST, monitor for cholinergic toxicity**

→ Scenario: Patient on donepezil + diphenhydramine → **notify provider (anticholinergic antagonizes therapy)**

PRIORITIZE → RECOGNIZE EARLY → ACT SAFELY

