

SYSTEM • MENTAL
HEALTH

PHARMACOLOGY •
TOXICOLOGY

NCLEX 2026 TEST
PLAN

⚠ HIGH-LETHALITY
OVERDOSE

TCA *Intoxication*

Tricyclic antidepressant overdose — clinical judgment, priority interventions, and patient teaching. The narrow therapeutic window means even a one-week supply can be lethal.



3 CS OF TCA TOXICITY • COMA • CONVULSIONS • CARDIOTOXICITY • DEATH POSSIBLE WITHIN 1-2 HRS OF INGESTION

1

SECTION 01 • FOUNDATIONS

Definition & Overview



- **What it is:** Overdose of tricyclic antidepressants — older agents used for depression, neuropathic pain, OCD (clomipramine), nocturnal enuresis (imipramine), and migraine prophylaxis.
- **Why it matters:** TCAs have a **narrow therapeutic index**. Doses as small as 10–20 mg/kg can be lethal — a single week's prescription can kill an adult.
- **Onset of toxicity:** Symptoms appear within **1–2 hours**; peak severity at **6 hours**. Anyone with even small ingestion needs continuous cardiac monitoring for at least 6 hours.

⚠ THE HEADLINE NCLEX FACT

TCA overdose is **far more lethal than SSRI overdose** — this is the primary reason SSRIs replaced TCAs as first-line for depression. If a depressed/suicidal patient is prescribed a TCA, expect questions about **limiting quantity dispensed** and **family supervision of medication**.

NARROW THERAPEUTIC INDEX

LETHAL IN OVERDOSE

CARDIAC EMERGENCY

2

SECTION 02 • MECHANISM

Pathophysiology — Why TCAs Kill



TCAs are "dirty drugs" — they block **five** different receptor systems. Therapeutic antidepressant action depends on the first, but overdose unleashes the others. The cardiac sodium-channel block is what kills.

A

Cardiac Na⁺ channel blockade FAST INWARD CURRENT ↓

Slows phase 0 depolarization in His-Purkinje system → **widened QRS**, right axis deviation, prolonged PR/QT, AV blocks, ventricular tachycardia/fibrillation.

QRS >100 ms

VT / VF

Asystole

★ The killer



B

Muscarinic (ACh) receptor blockade ANTICHOLINERGIC

Blocks parasympathetic outflow → the classic anticholinergic toxidrome: hot, dry, red, dilated, blind, mad, full.

Tachycardia

Mydriasis

Hyperthermia

Ileus / urinary retention

Delirium



C

α₁-Adrenergic blockade VASODILATION

Peripheral vasodilation + reduced cardiac contractility (from Na⁺ block) → **refractory hypotension**.

Hypotension

Orthostasis

Reflex tachy



D

CNS: H₁ blockade + GABA-A inhibition + NE/5-HT reuptake block

H₁ block → sedation/coma. GABA inhibition + monoamine surge → **seizures** (often a single brief tonic-clonic, but can be status).

Sedation → Coma

Seizures

Agitation

★ WHY BICARBONATE WORKS (KEY NCLEX RATIONALE)

Sodium bicarbonate produces **two** rescue effects: (1) the bolus of Na⁺ overcomes the cardiac sodium-channel blockade (mass-action), and (2) the alkalinizing pH (7.45–7.55) decreases the fraction of TCA bound to those channels. This is why bicarb — not antiarrhythmics — is the cornerstone treatment.

3

SECTION 03 • ASSESSMENT

Signs & Symptoms



🕒 **Early / Mild** (0-2 hrs post-ingestion)

OFTEN MISSED — LOOKS "JUST ANTICHOLINERGIC"

- Drowsiness, lethargy, mild confusion
- Dry mouth, dry mucous membranes
- Flushed, hot skin (no sweating)
- Dilated pupils (mydriasis)
- Blurred vision
- Mild sinus tachycardia (HR 100-130)
- Urinary retention, decreased bowel sounds
- Slurred speech, ataxia

🚑 **Late / Severe** (2-6 hrs • LIFE-THREATENING)

THE "3 CS" EMERGE — CALL RAPID RESPONSE

- **Coma** — GCS <8, airway compromise
- **Convulsions** — tonic-clonic seizures, may be status
- **Cardiotoxicity** — widened QRS >100 ms, VT, VF, torsades, asystole
- **Refractory hypotension** — SBP <90, not responsive to fluids
- Respiratory depression / arrest
- Hyperthermia (>40°C / 104°F)
- Metabolic acidosis (worsens cardiotoxicity)
- Cardiogenic shock, cardiac arrest

🚑 **CRITICAL RED FLAGS — NOTIFY PROVIDER STAT**

QRS >100 ms • R-wave in aVR >3 mm • Any seizure • SBP <90 mmHg • Altered LOC • QRS >160 ms = imminent ventricular dysrhythmia

🌶️ **Anticholinergic Toxidrome — the classic "head-to-toe" picture**



Hot

as Hades
↑ temp



Dry

as a bone
no sweat



Red

as a beet
flushed



Blind

as a bat
mydriasis



Mad

as a hatter
delirium



Full

as a flask
retention/ileus

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SECTION 04 • ACTION

Priority Nursing Interventions



Order matters on NCLEX. Apply **ABC + safety** first, then specific antidote (bicarb), then GI decontamination, then symptom management.

1

Secure the **AIRWAY** — anticipate intubation

Assess LOC, gag reflex, RR. **Administer** O₂ to keep SpO₂ > 94%. Prepare for endotracheal intubation if GCS < 8, absent gag, or respiratory depression. Have suction at bedside (aspiration risk).

2

Continuous **CARDIAC** monitoring + 12-lead ECG

Monitor QRS width (most predictive finding). Repeat ECG q1h × 6 hr minimum. Watch for: QRS > 100 ms, terminal R wave in aVR > 3 mm, AV block, VT/VF. Place defibrillator pads on chest.

3

★ Administer **IV SODIUM BICARBONATE** — the antidote

Indications: QRS > 100 ms, ventricular dysrhythmia, hypotension, or metabolic acidosis. **Dose:** 1–2 mEq/kg IV bolus, then infusion. **Goal:** arterial pH 7.45–7.55, QRS narrowing. **Monitor:** K⁺ (hypokalemia), pH, ABGs.

4

Establish **2 large-bore IVs** & give **NS boluses** for hypotension

Administer 0.9% NaCl 10–20 mL/kg. If still hypotensive → **norepinephrine** (direct α-agonist) is preferred. Avoid dopamine (less effective with α-blockade).

5

Activated charcoal — **ONLY** if airway protected & within **1–2 hr**

Dose: 1 g/kg PO/NG. **Do NOT give** if altered LOC without intubation (aspiration risk), bowel sounds absent/ileus, or > 2 hr post-ingestion. **Never** induce vomiting (no syrup of ipecac).

6

Treat seizures with **BENZODIAZEPINES**

First-line: lorazepam 2–4 mg IV or diazepam 5–10 mg IV. **Avoid phenytoin** (Na⁺ channel blocker — worsens cardiotoxicity). Place on seizure precautions: padded rails, suction ready, side-lying position.

7

Implement **suicide / safety precautions**

Assess intent, plan, lethality. **1:1 sitter**, remove sharps and personal medications, search belongings. Psychiatric evaluation **BEFORE** medical discharge. Document mental status and conversations precisely.

8

Monitor **minimum 6 hours; ICU** if symptomatic

Discharge criteria: asymptomatic, normal ECG, normal mental status at 6 hr post-ingestion. **ICU admission** if any: QRS widening, seizure, altered LOC, hypotension, or arrhythmia. Foley to track urine output (≥ 0.5 mL/kg/hr).

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SECTION 05 • DRUGS

Pharmacology — Common TCAs & Antidotes



COMMON TCAS — RECOGNIZE GENERIC + BRAND NAMES

DRUG (GENERIC / BRAND)	PRIMARY USE	KEY TOXICITY PROFILE	NURSING CONSIDERATIONS
Amitriptyline Elavil	Depression, neuropathic pain, migraine prophylaxis	Highest anticholinergic + sedation; most lethal in OD	Bedtime dosing; warn re: orthostasis & sedation; ↑ fall risk in older adults (Beers list)
Nortriptyline Pamelor / Aventyl	Depression in older adults (less anticholinergic)	Cardiotoxicity in OD; less sedation than amitriptyline	Monitor therapeutic level 50–150 ng/mL; baseline ECG before starting
Imipramine Tofranil	Depression, childhood enuresis	Cardiotoxicity high; sedation moderate	For enuresis: lowest effective dose; lock up — pediatric OD risk
Desipramine Norpramin	Depression, neuropathic pain	Most cardiotoxic per mg — most fatal OD ratio	Avoid in cardiac disease; baseline + follow-up ECG
Clomipramine Anafranil	OCD (also depression)	Lowers seizure threshold most among TCAs	Caution with seizure history; monitor for serotonin syndrome if combined with SSRI
Doxepin Sinequan / Silenor	Depression, anxiety, insomnia (low dose), pruritus	Strong sedation/H ₁ block; cardiotoxic in OD	Low-dose insomnia formulation is generally safer; full-dose has TCA risks



The Antidote — Sodium Bicarbonate

MAINSTAY OF TCA TOXICITY CARE

- ▶ **Mechanism:** Na⁺ load overcomes channel block; alkalization (pH 7.45–7.55) decreases TCA binding to Na⁺ channels
- ▶ **Indications:** QRS >100 ms, dysrhythmia, hypotension, acidosis
- ▶ **Dose:** 1–2 mEq/kg IV bolus → infusion (150 mEq in 1 L D5W at 250 mL/hr)
- ▶ **Monitor:** arterial pH, serum K⁺ (alkalosis drives hypokalemia), QRS width
- ▶ **Endpoint:** QRS narrowing, BP stabilization



Supportive Pharmacology

ADJUNCTS TO BICARBONATE & ABCS

- ▶ **Activated charcoal** 1 g/kg PO/NG — only if <2 hr & airway secure
- ▶ **Lorazepam / diazepam** — first-line for seizures
- ▶ **Norepinephrine** — preferred vasopressor for refractory hypotension (direct α₁)
- ▶ **Magnesium sulfate** 2 g IV — for torsades de pointes
- ▶ **IV lipid emulsion (Intralipid 20%)** — rescue for refractory cardiac arrest
- ▶ **Hypertonic saline 3%** — alternative if pH already alkalotic

⚠ NEVER ADMINISTER IN TCA OVERDOSE

Drugs that worsen toxicity or kill

Physostigmine

Class Ia (procainamide, quinidine)

Reverses anticholinergic effects elsewhere — but in TCA OD causes **asystole & seizures**. Old teaching, current contraindication.

Same Na⁺ channel block as TCAs — additive cardiotoxicity, will widen QRS further.

Class Ic (flecainide) & Class III (amiodarone)

Prolong QT and Na⁺ blockade. Avoid all "antiarrhythmics" — treat with bicarb instead.

Phenytoin / fosphenytoin for seizures

Itself a Na⁺ channel blocker — use **benzodiazepines** instead.

Flumazenil

If co-ingestion with benzodiazepines, can precipitate seizures (TCA already lowers threshold).

β-blockers / Ca²⁺ channel blockers

Add to hypotension & cardiac depression. Don't reach for them.

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SECTION 06 • EXAM STRATEGY

NCLEX Test Traps !



TRAP 01 • WIDE QRS

TCA OD with QRS 130 ms and BP 80/50. What does the nurse anticipate giving first?

✗ **WRONG**

Amiodarone or lidocaine "for the dysrhythmia"

✓ **RIGHT**

Sodium bicarbonate IV — antiarrhythmics worsen Na⁺ channel block

TRAP 02 • ANTICHOLINERGIC

Patient with TCA OD shows classic anticholinergic toxidrome. Give physostigmine?

✗ **WRONG**

Physostigmine "to reverse anticholinergic effects"

✓ **RIGHT**

Avoid physostigmine in TCA OD — causes asystole. Use supportive care.

TRAP 03 • ASYMPTOMATIC PT

Patient ingested unknown amount of amitriptyline 90 min ago, currently alert with normal vitals. Discharge?

✗ **WRONG**

"They look fine — discharge home with follow-up"

✓ **RIGHT**

Minimum 6 hours of cardiac monitoring — peak toxicity at hour 6

TRAP 04 • SEIZURE

TCA OD patient has a tonic-clonic seizure. Which medication should the nurse prepare?

✗ **WRONG**

Phenytoin / fosphenytoin "first-line for seizures"

✓ **RIGHT**

Lorazepam (or diazepam) IV — phenytoin is a Na⁺ blocker

TRAP 05 • CHARCOAL MISUSE

Obtunded TCA OD patient, GCS 7, ingestion 30 min ago. Give activated charcoal?

✗ **WRONG**

"It's been <1 hr — give the charcoal PO"

✓ **RIGHT**

Intubate FIRST — charcoal in an unprotected airway → aspiration pneumonitis

TRAP 06 • SUICIDE WINDOW

Newly-started TCA patient reports "feeling better, more energy" at week 2. Reassuring?

✗ **WRONG**

"Great — the medication is working"

✓ **RIGHT**

HIGHEST suicide risk — energy returns before mood. Reassess plan/lethality.

TRAP 07 • SEVERITY MARKER

Which assessment finding BEST predicts severity in TCA overdose?

✗ **WRONG**

Serum TCA level — slow, unreliable, doesn't change management

✓ **RIGHT**

QRS duration on ECG — >100 ms = toxic, >160 ms = arrhythmia imminent

TRAP 08 • TCA VS SSRI

Why is fluoxetine preferred over amitriptyline for a depressed adolescent with passive SI?

✗ **WRONG**

"Fluoxetine works faster" (false — both ~4 weeks)

✓ **RIGHT**

Far less lethal in overdose — TCAs have narrow therapeutic index

Patient & Family Education



Safety & Storage

- ✓ Lock medication in cabinet — out of reach of children & suicidal family members
- ✓ Prescriber may dispense only 1-week supply at a time during early treatment
- ✓ Bring all unused pills to a take-back program — do NOT flush
- ✓ Never share medication with anyone, even with similar symptoms



How to Take It

- ✓ Take at **bedtime** to use sedation as a benefit and reduce daytime grogginess
- ✓ Take exactly as prescribed — do NOT double up if a dose is missed
- ✓ Full antidepressant effect takes **2–4 weeks** (sometimes 6 weeks)
- ✓ Side effects often appear first; therapeutic effect appears later



What to Avoid

- ✓ **No alcohol** — additive sedation, ↑ overdose risk
- ✓ No abrupt stopping — taper to avoid discontinuation syndrome (flu-like, GI upset, vivid dreams)
- ✓ No MAOIs within **14 days** before or after — risk of hypertensive crisis & serotonin syndrome
- ✓ Use caution with anticholinergics, antihistamines, opioids (additive effects)



Managing Side Effects

- ✓ **Dry mouth:** sugar-free gum, ice chips, frequent sips of water
- ✓ **Constipation:** ↑ fluids, ↑ fiber, daily activity, stool softener if needed
- ✓ **Orthostatic hypotension:** rise slowly from sitting/lying; dangle legs first
- ✓ **Photosensitivity:** sunscreen, protective clothing outdoors
- ✓ **Urinary retention:** report difficulty voiding promptly



When to Call 911 / Go to ER

- ✓ Any accidental or intentional overdose — even if “feels fine”
- ✓ Suicidal thoughts, especially with a plan
- ✓ Chest pain, palpitations, fainting, irregular heartbeat
- ✓ Seizure activity, confusion, severe agitation
- ✓ Rash with fever, mouth sores (rare hypersensitivity)
- ✓ Inability to urinate > 8 hours



For Families & Caregivers

- ✓ Watch for worsening depression or new suicidal talk — **greatest risk in first 1–4 weeks**
- ✓ “Activation” before mood improves — patient may feel energy to act on suicidal thoughts
- ✓ Keep ER number visible; know location of nearest crisis center
- ✓ Attend appointments with the patient when possible — provide collateral information
- ✓ Remove firearms, large medication quantities, alcohol from the home

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SECTION 08 • RECALL

Memory Boosters & Mnemonics



3C

3 C's of TCA Toxicity

THE DEADLY TRIAD — NEVER FORGET

- C** **Coma** — sedation deepening to unconsciousness
- C** **Convulsions** — seizures (treat with benzos)
- C** **Cardiotoxicity** — widened QRS, dysrhythmias, hypotension

A

ABCD of TCA Care

PRIORITY MANAGEMENT ORDER

- A** **Airway** — intubate if GCS < 8
- B** **Bicarbonate** — antidote for cardiotoxicity
- C** **Charcoal** — only if < 2 hr & airway secure
- D** **Diazepam** (benzo) — for seizures



Anticholinergic Toxidrome

HEAD-TO-TOE HEAD-TO-TOE PICTURE

- Hot** as Hades (hyperthermia)
- Red** as a beet (flushed skin)
- Dry** as a bone (no sweat, dry mouth)
- Blind** as a bat (mydriasis, blurry)
- Mad** as a hatter (delirium)
- Full** as a flask (urinary retention, ileus)

T

"TCA" itself — the danger signs

TOP THREE VITAL-SIGN CHANGES

- T** **Tachycardia** (early sinus, then VT)
- C** **Cardiac dysrhythmia** with widened QRS
- A** **Anticholinergic + Acidosis + Altered LOC**



QRS Rule of 100 & 160

CARDIAC RISK THRESHOLDS

- 100** QRS > 100 ms → toxic, give **bicarbonate**
- 160** QRS > 160 ms → **imminent VT/VF**, ICU
- aVR** R wave in aVR > 3 mm → confirms TCA toxicity



The "6-Hour Rule"

OBSERVATION & CLEARANCE

- 1–2** **1–2 hours:** symptoms begin to appear
- 6** **6 hours:** peak toxicity — minimum monitoring window
- ✓ **Asymptomatic + normal ECG at 6 hr** = safe to clear medically

★ THE ONE-LINE REVIEW

TCA overdose = a **cardiac emergency** dressed up as an anticholinergic toxidrome. Watch the QRS, give bicarbonate, secure the airway, treat seizures with benzos, and never reach for physostigmine, antiarrhythmics, or phenytoin.

Mental Health NCLEX • High-Yield Infographic Series

Aligned to 2026 NCLEX Test Plan • Psychosocial Integrity & Pharmacological Therapies

TCA Intoxication • v1.0

For exam preparation — not clinical decision-making