

⚡ CARDIAC PROCEDURE

Cardioversion

Synchronized Electrical Therapy for Tachydysrhythmias

NGN NCLEX 2026

CARDIAC SYSTEM

HIGH PRIORITY

PHARM + PROCEDURE

1

Definition & Overview

What it is + why it matters

Cardioversion is the delivery of a **synchronized** electrical shock to the heart, timed to the **R-wave** of the QRS complex, to convert an unstable but perfusing tachydysrhythmia back to **normal sinus rhythm (NSR)**.

USED FOR

A-Fib • A-Flutter • SVT • V-Tach *WITH a pulse*

NEVER FOR

V-Fib • Pulseless V-Tach • Asystole
(needs **DEFIBRILLATION** or **CPR**)

WHY IT MATTERS

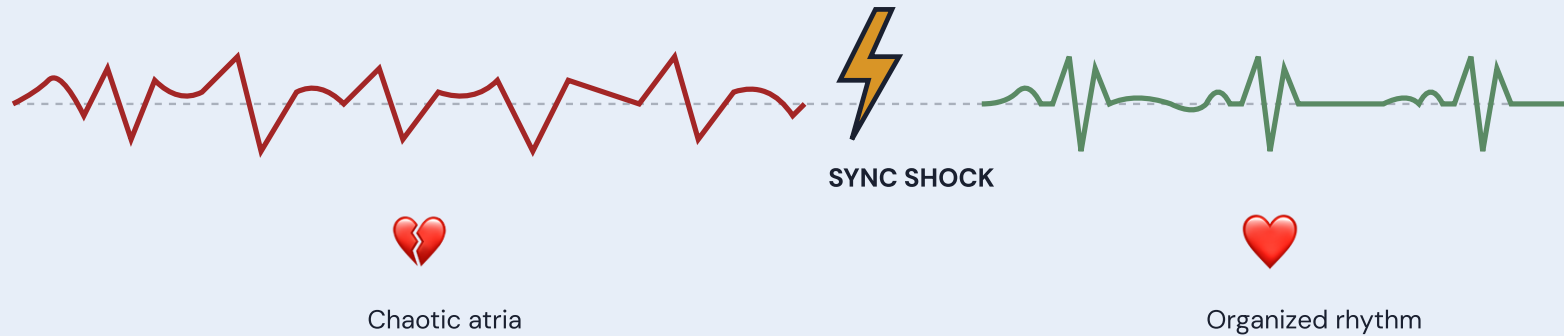
Restores cardiac output, prevents thrombi, stops sustained tachy-arrhythmias

Cardioversion vs. Defibrillation

Feature	Cardioversion	Defibrillation
SYNCHRONIZATION	SYNC ON — fires on R-wave	NO SYNC — fires immediately
PATIENT STATUS	Pulse present (stable or unstable)	Pulseless / no organized rhythm
RHYTHMS	A-Fib, A-Flutter, SVT, V-Tach <i>w/ pulse</i>	V-Fib, Pulseless V-Tach
ENERGY (JOULES)	Low — start 50–200 J biphasic	High — 200–360 J
SEDATION	YES (elective) — conscious sedation	NO — emergency, patient unresponsive
TIMING	Often elective & scheduled	Emergency, immediate

BEFORE: A-Fib (irregular, no P waves)

AFTER: Normal Sinus Rhythm



Cardioversion converts a chaotic, irregular rhythm back to organized sinus rhythm via a synchronized shock.

2

Pathophysiology & Mechanism

How cardioversion resets the heart

The shock **depolarizes a critical mass of myocardium simultaneously**, ending the re-entry circuits or ectopic foci that drive the dysrhythmia. The **SA node** — the heart's natural pacemaker — then resumes control, producing organized contraction.

1

Abnormal Rhythm

Re-entry circuits / ectopic foci fire chaotically

2

Sync to R-Wave

Machine senses QRS, avoids vulnerable T-wave

3

Shock Delivered

Mass depolarization of myocardium

4

SA Node Resumes

Pacemaker takes over → NSR restored

Why SYNC matters: If a shock fires on the **T-wave** (relative refractory period), it can trigger **R-on-T phenomenon** → V-Fib. Synchronization ensures the shock lands safely on the R-wave.

3

Indications: When Cardioversion Is Needed

Stable vs. Unstable presentation

● Stable Tachydysrhythmia

Patient perfusing — try meds first; elective cardioversion if meds fail.

- ▶ Palpitations / "fluttering" sensation
- ▶ Mild fatigue or weakness
- ▶ Anxiety, restlessness
- ▶ Mild dyspnea on exertion
- ▶ BP within normal limits
- ▶ HR > 150 but mentating well

● Unstable — RED FLAGS 🚩

Immediate synchronized cardioversion indicated.

- ▶ **Hypotension** (SBP < 90 mmHg)
- ▶ **Altered mental status** / confusion
- ▶ **Chest pain** / acute ischemia
- ▶ **Acute heart failure** (crackles, JVD)
- ▶ **Signs of shock** (cool, clammy, mottled)
- ▶ **HR > 150** with poor perfusion

The "4 Ds" of Instability → *Decreased BP, Diminished mentation, Discomfort (chest pain), Dyspnea/HF.* ANY one = shock.

4

Priority Nursing Interventions

ABCs • Safety • NCLEX prioritization

PHASE 1 PRE-PROCEDURE

- ▶ **Verify informed consent** is signed (elective procedures only)
- ▶ **NPO 6–8 hours** before procedure (sedation aspiration risk)
- ▶ **Confirm anticoagulation** — therapeutic for ≥ 3 –4 weeks if A-Fib > 48 hrs OR a TEE has ruled out atrial thrombus
- ▶ **Hold digoxin 24–48 hours** prior — increases risk of post-shock dysrhythmias
- ▶ **Check K^+ and Mg^{2+}** — correct imbalances before shock (low K^+ → V-Fib risk)
- ▶ **Baseline 12-lead ECG**, vital signs, oxygen saturation
- ▶ **Establish IV access** (large-bore preferred) and apply cardiac monitor
- ▶ **Prepare emergency equipment** — crash cart, suction, intubation supplies, defib pads in place
- ▶ **Remove dentures, jewelry, transdermal patches** from chest

PHASE 2 DURING PROCEDURE

- ▶ **Administer conscious sedation** (midazolam, propofol, etomidate) per provider order
- ▶ **Apply O_2** — but **REMOVE O_2 source from the bed during shock** (fire/explosion risk)
- ▶ **Engage the SYNC button** on the defibrillator — verify markers appear on R-waves
- ▶ **Place pads correctly** — anterior–lateral OR anterior–posterior position
- ▶ **Call out "ALL CLEAR"** — visually confirm no one is touching patient or bed before shock

- ▶ **Start at lowest effective joules** (typically 50–100 J biphasic for A-Fib; 100–200 J for A-Flutter/SVT)
- ▶ **Monitor ECG continuously** during and after each shock — re-sync between shocks if needed
- ▶ **Watch for V-Fib** — if it occurs, immediately turn SYNC OFF and defibrillate

PHASE 3 POST-PROCEDURE

- ▶ **Airway/Breathing first** — sedation can cause respiratory depression; monitor SpO₂, RR, ETCO₂
- ▶ **VS every 15 min × 1 hr**, then every 30 min until stable
- ▶ **Continuous cardiac monitoring** — confirm rhythm conversion and watch for recurrence
- ▶ **Neuro checks** 🚑 — assess for stroke (facial droop, slurred speech, hemiparesis) — embolic event from dislodged atrial thrombus
- ▶ **Inspect skin** at pad sites for burns; apply hydrocortisone cream if mild redness
- ▶ **Continue anticoagulation × 4 weeks minimum** after successful conversion (atrial stunning persists)
- ▶ **Pain assessment** — chest soreness common; treat with mild analgesia
- ▶ **NPO until fully alert**, gag reflex returns, swallow safely

🚑 **Highest Priority Post-Shock Complication: Embolic stroke** from dislodged atrial thrombus. Sudden onset of neurological deficit = call provider immediately.

5

Pharmacology

Anticoagulants • Antiarrhythmics • Sedation

Warfarin (Coumadin)

VITAMIN K ANTAGONIST • ANTICOAGULANT

- **Use:** Pre/post cardioversion (≥ 3 –4 wk before, ≥ 4 wk after) for A-Fib > 48 hr
- **Monitor:** INR (target 2.0–3.0), PT
- **Antidote:** Vitamin K
- **Teach:** Consistent green leafy vegetable intake — don't binge or avoid

Apixaban / Rivaroxaban

DOAC • DIRECT FACTOR XA INHIBITOR

- **Use:** Alternative to warfarin — no INR monitoring needed
- **Monitor:** Bleeding signs, renal function
- **Antidote:** Andexanet alfa
- **Teach:** Take consistently, never skip doses

Heparin

ANTICOAGULANT • IV/SQ

- **Use:** Bridge anticoagulation peri-procedure
- **Monitor:** aPTT (1.5–2 $\times$ normal), platelets (HIT risk)
- **Antidote:** Protamine sulfate

Amiodarone (Cordarone)

CLASS III ANTIARRHYTHMIC

- **Use:** Chemical cardioversion; rhythm control before/after electrical
- **SE:** Pulmonary fibrosis, hepatotoxicity, thyroid dysfunction, blue-gray skin, corneal deposits
- **Monitor:** PFTs, LFTs, TSH, ECG (QT prolongation)

Digoxin (Lanoxin)

CARDIAC GLYCOSIDE • HOLD PRE-PROCEDURE

- **Action:** Hold 24–48 hr before cardioversion
- **Why:** Increases risk of post-shock V-Fib / lethal arrhythmias
- **Toxicity sign:** N/V, yellow-green halos, level > 2.0 ng/dL

Midazolam (Versed) / Propofol

SEDATION AGENTS

- **Use:** Conscious sedation during elective cardioversion
- **Monitor:** RR, SpO₂, BP, LOC continuously
- **Reversal:** Flumazenil (for Versed) — propofol has none
- **Risk:** Respiratory depression, hypotension

The 48-Hour Rule: If A-Fib has lasted > 48 hours (or unknown duration), the patient needs **3–4 weeks of therapeutic anticoagulation** OR a **TEE** to rule out left atrial thrombus before cardioversion. Otherwise the shock can dislodge a clot → stroke.

6

NCLEX Test Traps ⚠*Wrong-answer patterns & correct alternatives*

X Choosing "defibrillation" for A-Fib with a pulse

✓ Cardioversion (synchronized) for any rhythm with a pulse — defib is for pulseless V-Fib / V-Tach only

X Holding the patient's anticoagulant before cardioversion to "prevent bleeding"

✓ Anticoagulation must be CONTINUED — stopping it raises stroke risk; the danger is embolus, not bleeding

X Forgetting to engage the SYNC button

✓ Always verify SYNC is ON and R-wave markers are visible before each shock — unsynced shock can trigger V-Fib

X Continuing digoxin up to the day of cardioversion

✓ HOLD digoxin 24–48 hrs prior — increases post-shock dysrhythmia risk

X Stopping anticoagulation immediately after successful conversion

✓ Continue ≥ 4 weeks post — atria are "stunned" and can still form clots even in NSR

X Cardioverting new-onset A-Fib of unknown duration without TEE or anticoagulation

✓ Either 3–4 weeks therapeutic anticoagulation OR TEE to rule out atrial thrombus first

X Leaving oxygen on the patient's face during the shock

✓ REMOVE O₂ source from the bed area — sparks + O₂ = fire/explosion hazard

X If V-Fib develops mid-procedure, hitting "shock" again with SYNC still on

✓ Turn SYNC OFF and DEFIBRILLATE — synced machines won't fire on V-Fib because there's no R-wave to detect

7

NCJMM Clinical Judgment Framework

NCSBN's 6-step model for the NGN

1

Recognize Cues

Irregular rhythm on monitor, HR > 150, palpitations, hypotension, AMS. Identify A-Fib, A-Flutter, SVT, or V-Tach with pulse.

2

Analyze Cues

Stable vs. unstable? Onset > 48 hrs? Anticoagulated? K⁺/Mg²⁺ adequate? Held digoxin? NPO status confirmed?

3

Prioritize Hypotheses

#1 Airway/Circulation. #2 Embolic stroke risk. #3 Dysrhythmia recurrence. #4 Sedation safety. #5 Skin integrity.

4

Generate Solutions

Ensure anticoagulation, NPO, IV access, sedation, sync mode, correct joules, crash cart ready, post-procedure monitoring plan.

5

Take Action

Verify SYNC. Apply pads. Sedate. "All clear." Deliver shock. Monitor rhythm. Reassess ABCs. Notify HCP if V-Fib develops.

6

Evaluate Outcomes

Rhythm converted to NSR? VS stable? Neuro intact (no stroke)? Skin intact? Patient awake & protecting airway? Pain controlled?

8

Patient & Family Education

Discharge teaching that prevents readmission

-
- ✓ **Take anticoagulants exactly as prescribed** — for at least 4 weeks after, even if you "feel fine"
 - ✓ **NPO for 6–8 hours** before any elective cardioversion (water, food, gum)
 - ✓ **Arrange a ride home** — sedation effects last 24 hours; do not drive, operate machinery, or sign legal documents
 - ✓ **Recognize stroke symptoms — F.A.S.T.:** Facial droop, Arm weakness, Speech difficulty, Time to call 911
 - ✓ **Mild chest soreness and pink/red skin** at pad sites is normal for a few days; report blistering or severe burns
 - ✓ **Report immediately:** palpitations returning, chest pain, dizziness, fainting, severe shortness of breath
 - ✓ **Limit caffeine and alcohol** — both are common A-Fib triggers
 - ✓ **Take a daily pulse** for one minute — note rate and regularity; report new irregularities
 - ✓ **Continue all cardiac medications** (rate-control, antiarrhythmics) unless told otherwise
 - ✓ **Keep all follow-up appointments** for ECG, anticoagulation labs, and rhythm monitoring
 - ✓ **Manage triggers:** stress, dehydration, untreated sleep apnea, thyroid disease, electrolyte imbalances
 - ✓ **Wear a medical alert bracelet** indicating A-Fib and anticoagulant therapy

9

Memory Boosters & Mnemonics

Pattern recognition for fast NCLEX recall

SHOCK — *Pre-Procedure Checklist*

- ★ **S**edation ready (midazolam, propofol)
- ★ **H**old digoxin 24–48 hr before
- ★ **O**2 ready BUT off bed during shock
- ★ **C**onsent & anticoag confirmed
- ★ **K**⁺ and Mg²⁺ checked & corrected

"SYNC OR SINK"

- ★ **SYNC ON** = pulse present (cardioversion)
- ★ **SYNC OFF** = pulseless (defibrillation)
- ★ Forgetting to sync can *sink* the patient into V-Fib

The 4 Ds — *Unstable Cues*

- ★ **D**ecreased BP (hypotension)
- ★ **D**iminished mentation (AMS)
- ★ **D**iscomfort (chest pain)
- ★ **D**yspnea / acute heart failure

"3 Before, 4 After"

- ★ **3 weeks** of anticoagulation BEFORE (if A-Fib > 48 hr)
- ★ **4 weeks** of anticoagulation AFTER successful conversion
- ★ Atria stay "stunned" — clot risk persists past NSR

CARD — *Rhythms That Get Cardioverted*

- ★ **C**ontrolled (stable) tachy w/ pulse
- ★ **A**-Fib & A-Flutter
- ★ **R**egular SVT
- ★ **D**etectable pulse — V-Tach *WITH* pulse

"LOW & SLOW"

- ★ **LOW** joules to start (50–100 J biphasic)
- ★ **SLOW** escalation if first shock fails
- ★ Defib uses HIGH joules (200–360 J) — opposite!

One-Liner Recall: *"Cardioversion = SYNC the cardiac rhythm. Pulse present, low joules, sedated, planned. Defibrillation = no pulse, no sync, high joules, NOW."*

Cardioversion — NGN NCLEX 2026 High-Yield Reference

Personal study material • Review with current evidence-based guidelines & institutional policy