CARDIOVASCULAR · VASCULAR EMERGENCY · NGN NCLEX 2026

Aortic *Dissection*

A life-threatening tear in the inner aortic wall where blood surges between layers, creating a false lumen. Mortality rises ~1% per hour untreated for Type A — minutes matter.

ACUITY · EMERGENCY MORTALITY · 1%/HOUR #1 RISK FACTOR · HTN HALLMARK · "TEARING" PAIN

1 Definition & Overview

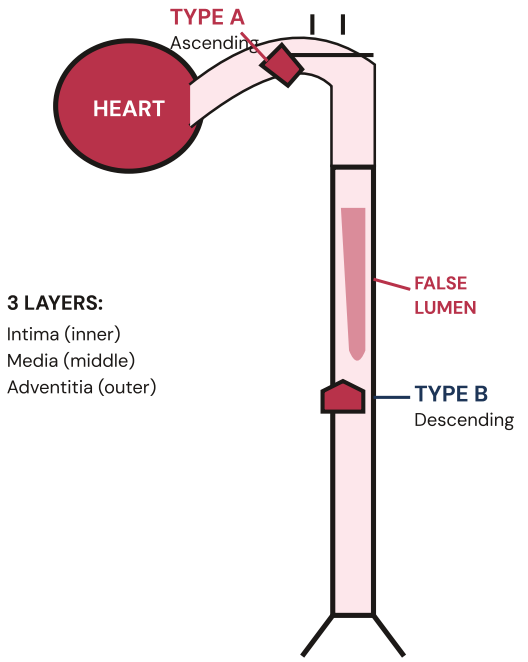
WHAT IT IS · WHY IT KILLS

- **Tear in the intima** (innermost layer) of the aorta allows blood to enter the wall under high pressure.
- Blood **dissects (separates)** the inner from the middle layer (media), creating a **false lumen**.
- The dissection can **propagate**, occlude branch arteries (causing organ ischemia), or **rupture** — leading to massive hemorrhage, cardiac tamponade, and death.
- The **most lethal vascular emergency**: untreated Type A mortality is ~50% at 48 hours.

⚠ KEY RISK FACTORS

- **Uncontrolled hypertension** (#1 cause)
- Atherosclerosis, advanced age, male sex
- **Connective tissue disorders:** Marfan, Ehlers-Danlos
- Bicuspid aortic valve, coarctation
- Pregnancy (3rd trimester), trauma (deceleration)
- **Cocaine** / stimulant use (acute HTN spike)

AORTIC WALL DISSECTION



TYPE A
Ascending
SURGERY

TYPE B
Descending
MEDICAL

2 Pathophysiology

HOW THE CASCADE UNFOLDS

1. Aortic wall weakens from chronic HTN, atherosclerosis, or connective tissue disease
2. Intimal tear develops — the innermost layer rips under shear stress
3. High-pressure blood enters between intima and media, splitting the layers apart
4. False lumen forms; dissection propagates along the aorta with each heartbeat
5. Branch arteries become occluded → organ ischemia (kidneys, brain, spinal cord, limbs)
6. RUPTURE → massive hemorrhage, cardiac tamponade, exsanguination, DEATH

STANFORD CLASSIFICATION — DRIVES THE WHOLE TREATMENT PLAN

TYPE A	TYPE B
Ascending aorta involved (with or without descending) **SURGICAL EMERGENCY** — high risk of tamponade, aortic regurgitation, MI **~60–70% of all dissections**	**Descending aorta only** (distal to left subclavian) **MEDICAL MANAGEMENT** first — aggressive BP/HR control; surgery only if complicated **~30–40% of all dissections**

3 Signs & Symptoms

RECOGNIZE CUES · CATCH IT BEFORE RUPTURE

🟡 Early / Classic Cues

- **SUDDEN, severe, "tearing" or "ripping" pain** — the hallmark
- Pain reaches **maximum intensity at onset** (unlike MI which builds)
- **Type A:** anterior chest pain, radiates to neck/jaw
- **Type B:** back pain between scapulae, radiates to abdomen
- Diaphoresis, pallor, nausea
- **Anxiety / "feeling of impending doom"**
- Initially **HYPERtensive** (sympathetic surge)

🔴 Late / Severe — Rupture Imminent

- **BP difference {greater than}20 mmHg between arms** 🚨
- **Pulse deficit** — weak/absent pulse in one limb
- **HYPOtension & shock** (rupture or tamponade)
- New aortic regurgitation murmur (Type A)
- Neuro deficits — stroke-like, paraplegia (spinal artery)
- Syncope, altered LOC
- Cool, mottled, pulseless extremity
- Decreased urine output (renal artery occlusion)

🚨 RED FLAG TRIAD — BECK'S TRIAD OF CARDIAC TAMPONADE

IF TYPE A DISSECTION RUPTURES INTO THE PERICARDIUM:

1. Hypotension

Falling BP from compression

2. JVD

Distended neck veins

3. Muffled Heart Sounds

Fluid around the heart

4 Priority Nursing Interventions

ABCS · TAKE ACTION · LOWER THE SHEAR STRESS

A

AIRWAY

- Maintain patent airway
- Prepare for intubation if LOC declines
- Suction prn

B

BREATHING

- Apply **O_2** — keep SpO_2 {greater than}94%
- Monitor RR, lung sounds
- Watch for tamponade-related dyspnea

C

CIRCULATION

- **2 large-bore IVs** (18g)
- BP in **BOTH arms** q5–15 min
- Continuous cardiac monitor + arterial line

🎯 Hemodynamic Targets

- **SBP 100–120 mmHg** (permissive hypotension)
- **HR 60–80 bpm** (decrease shear stress)
- MAP 70–80 mmHg
- Urine output {greater than}30 mL/hr
- Adequate pain control (lowers catecholamines)

📋 Critical Nursing Actions

- **Strict bed rest** — HOB low Fowler's, NO ambulation
- **NPO** — anticipate emergency surgery
- **Type & cross-match** 4–6 units PRBCs
- IV opioids (morphine) — pain + sympathetic block
- Q15-min neuro checks & pulse checks (all 4 limbs)
- **Prep for CT angiography** (definitive Dx)

- Avoid Valsalva — stool softeners, calm environment
- Type A → STAT cardiothoracic surgery consult

5 Pharmacology

THE ORDER MATTERS — BETA-BLOCKER FIRST, ALWAYS

⚠ CRITICAL SEQUENCING RULE

ALWAYS give the IV beta-blocker BEFORE the vasodilator. Giving a vasodilator first triggers reflex tachycardia → increases shear stress → worsens the dissection. Lower the heart rate first, then lower the blood pressure.

FIRST-LINE

Esmolol · Labetalol

IV BETA-BLOCKERS — START HERE

ACTION	Decrease HR & contractility → reduce shear stress on aortic wall
GOAL	HR 60–80 bpm; SBP 100–120 mmHg
SIDE FX	Bradycardia, hypotension, bronchospasm, heart block
CAUTION	Asthma/COPD (use cardioselective like esmolol); decompensated HF
NURSING	Continuous BP & HR; assess lung sounds; never stop abruptly

ADD AFTER BB

Nitroprusside (Nipride)

IV VASODILATOR — TITRATED

ACTION	Direct arterial & venous vasodilator → rapid afterload reduction
ORDER	**NEVER before beta-blocker** — causes reflex tachycardia
SIDE FX	**Cyanide/thiocyanate toxicity** ({greater than}48h or in renal failure)
LIGHT	Protect bag/tubing from light (wrap in foil)
NURSING	Arterial line preferred; titrate to SBP 100–120; monitor lactate, ABGs

SUPPORTIVE

Morphine Sulfate IV

OPIOID ANALGESIC

ACTION	Pain control + reduces sympathetic surge (lowers BP & HR indirectly)
SIDE FX	Respiratory depression, hypotension, sedation, constipation
ANTIDOTE	Naloxone (Narcan)
NURSING	Monitor RR (hold if {less than}12), pain scale, BP; never under-treat dissection pain

ALTERNATIVE

Diltiazem · Verapamil

NON-DIHYDROPYRIDINE CCBS

WHEN	Used **only if beta-blockers are contraindicated** (severe asthma)
ACTION	Slow HR + reduce contractility (similar effect to BB)
SIDE FX	Bradycardia, hypotension, AV block, peripheral edema

NURSING Cardiac monitor; avoid combining with beta-blockers (additive bradycardia)

6 NCLEX Test Traps

WHERE STUDENTS LOSE POINTS

1 MISTAKING AORTIC DISSECTION FOR MI

❌ Wrong: Treating chest pain like an MI (aspirin, heparin, thrombolytics).

✅ Right: Dissection pain is "tearing/ripping" radiating to the BACK with unequal arm BPs and pulse deficits. MI pain is "crushing/pressure," is bilaterally symmetric, and develops more gradually.

2 VASODILATOR BEFORE BETA-BLOCKER

❌ Wrong: Starting nitroprusside first to lower BP rapidly.

✅ Right: Beta-blocker FIRST to slow the heart, THEN add the vasodilator. Skipping this order causes reflex tachycardia, more shear stress, and a worse dissection.

3 GIVING THROMBOLYTICS OR ANTICOAGULANTS

❌ Wrong: tPA, heparin, or aspirin "because it's chest pain."

✅ Right: NEVER give thrombolytics/anticoagulants in suspected dissection — they cause catastrophic hemorrhage and rupture. Confirm diagnosis with CT angiography before any clot-related drug.

4 AGGRESSIVE IV FLUID RESUSCITATION

❌ Wrong: Bolusing fluids "because the patient is in shock."

✅ Right: Permissive hypotension (SBP 100–120) is the goal. Aggressive fluids raise BP and worsen dissection. Fluids/blood are reserved for confirmed rupture/hemorrhagic shock.

5 SKIPPING BILATERAL ARM BP

❌ Wrong: Taking BP only on the right arm.

✅ Right: BP in BOTH arms is essential — a difference {greater than}20 mmHg is a classic dissection finding and one of the highest-yield NCLEX cues.

6 ALLOWING ACTIVITY, VALSALVA, OR STRAINING

❌ Wrong: Ambulating to bathroom, withholding stool softeners.

✅ Right: Strict bed rest. Use bedpan, stool softeners, and a calm environment. Any Valsalva spike can rupture the aorta.

7 MISSING THE PULSE DEFICIT

❌ Wrong: Documenting "pulses present" without comparing limbs.

✅ Right: Compare pulses in all four extremities. An absent or weak pulse in one limb signals the dissection has occluded a branch artery.

7 NCJMM Clinical Judgment

THE 6-STEP NGN FRAMEWORK APPLIED TO DISSECTION

1

RECOGNIZE CUES

Sudden tearing pain · BP differs between arms · pulse deficit · new murmur · diaphoresis

Cluster: severe pain at maximum intensity at onset + asymmetric perfusion findings + HTN history.

2

ANALYZE CUES

"Tearing" pain + unequal arms + HTN history → think aortic dissection, NOT MI

Distinguish from MI (crushing pressure), PE (dyspnea-dominant), pneumothorax (breath-sound asymmetry).

3

PRIORITIZE HYPOTHESES

Type A = surgical emergency · Type B = medical management first

Anterior chest pain + new murmur + tamponade signs → Type A. Back pain only → Type B.

4

GENERATE SOLUTIONS

IV beta-blocker → vasodilator → pain control → CT angiography → surgery (Type A)

Sequence-driven: lower HR before BP. Permissive hypotension (SBP 100–120). Type & cross 4–6 units.

5

TAKE ACTION

Bed rest · 2 large-bore IVs · BP both arms q5–15 min · esmolol IV · prep for OR

NPO, arterial line, foley, continuous cardiac monitor, q15-min neuro & pulse checks, no Valsalva.

6

EVALUATE OUTCOMES

HR 60–80 · SBP 100–120 · pain controlled · equal pulses · no neuro deficit · UO {greater than}30 mL/hr

Worsening neuro changes, falling Hgb, expanding hematoma on CT → urgent escalation.

8 Patient & Family Education

LIFELONG VIGILANCE PREVENTS RECURRENCE

BP CONTROL IS LIFELONG

Take antihypertensives every day, never skip doses. Target SBP {less than}120. Home BP log and bring to every visit.

AVOID HEAVY LIFTING & STRAINING

No lifting {greater than}10 lb, no Valsalva, no isometric exercise. Use stool softeners; treat constipation early.

NO STIMULANTS

Absolute avoidance of cocaine, methamphetamines, and high-dose caffeine. These cause sudden BP spikes that can re-tear the aorta.

SMOKING CESSATION

Smoking accelerates atherosclerosis and weakens the aortic wall. Provide cessation resources and nicotine replacement.

SURVEILLANCE IMAGING

Lifelong CT/MRI follow-up — typically at 1, 3, 6, 12 months, then yearly. Never miss appointments.

WARNING SIGNS → ED NOW

Sudden chest/back pain, new weakness in a limb, syncope, severe abdominal pain. Call 911 — do not drive yourself.

DIET & LIFESTYLE

Low-sodium, heart-healthy diet (DASH or Mediterranean). Moderate aerobic exercise (walking, swimming) — no contact sports.

GENETIC COUNSELING

If Marfan, Ehlers-Danlos, or familial dissection: refer for genetic testing & screen first-degree relatives.

MEDICATION ADHERENCE

Most are on lifelong beta-blockers. Don't stop suddenly — risk of rebound tachycardia & HTN.

PREGNANCY CAUTION

Women with prior dissection or Marfan need pre-pregnancy cardiology consult; pregnancy raises rupture

risk.

9 Memory Boosters & Mnemonics

ANCHOR THE PATTERNS FOR TEST DAY

T "TEAR" — Recognize the Cues

- **T** — **Tearing pain** — sudden, severe, max at onset
- **E** — **Extremities** — unequal BP & pulse deficit
- **A** — **Aorta** — HTN history, atherosclerosis
- **R** — **Radiates** — to back, between scapulae

A "AORTIC" — Emergency Response

- **A** — **Assess** BP in BOTH arms (q5–15 min)
- **O** — **Oxygen** + 2 large-bore IVs
- **R** — **Reduce HR** with beta-blocker FIRST
- **T** — **Then vasodilator** (nitroprusside)
- **I** — **Imaging** — CT angiography (gold standard)
- **C** — **Call surgery** for Type A — STAT

🧠 Stanford Classification Memory Hook

Type A = Ascending

- **A**scending aorta
- **A**nterior chest pain
- **A**ction = surgery (urgent)
- **A**ortic regurgitation murmur possible

Type B = Below

- **B**elow the left subclavian
- **B**ack pain (between scapulae)
- **B**eta-blockers + medical management
- Surgery only if complicated

⚡ High-Yield Quick Recalls

- **Pain quality:** "Like being torn in half" or "ripping" → think dissection (NOT MI)
- **The order rule:** "Heart rate before blood pressure" — beta-blocker before vasodilator
- **BP rule:** "Take BP in both arms — always" (a {greater than}20 mmHg difference is gold)
- **Permissive hypotension:** SBP 100–120 — don't fluid-resuscitate aggressively
- **NEVER** give thrombolytics, heparin, or full-dose aspirin in suspected dissection
- **Beck's Triad** (hypotension + JVD + muffled heart sounds) = tamponade from rupture
- **Definitive Dx:** CT angiography (TEE if unstable)

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