Aortic Dissection

Acute aortic syndrome · Rate first, then pressure, then the surgeon

1% MORTALITY / HOUR
untreated type A

SUSPECT IT *the great mimic — missed in up to a third of cases*

THE STORY

Abrupt, maximal-at-onset tearing or ripping chest or back pain, often migrating. **Severity at onset** is the clue — MI pain crescendos, dissection pain peaks instantly.

EXAMINE FOR

Pulse or BP differential between arms (> 20 mmHg) · new **aortic regurgitation** murmur · **focal neuro deficit** or syncope · limb or mesenteric ischemia · tamponade.

CONFIRM

CT angiography of chest/abdomen/pelvis is the test of choice. **TEE** if too unstable to travel. **A normal D-dimer does not exclude it** — never rule out on D-dimer alone.

CLASSIFY — THIS DECIDES EVERYTHING *Stanford*

TYPE A — involves the ascending aorta

Surgical emergency. Call cardiothoracic surgery immediately, in parallel with medical therapy. Mortality rises roughly **1% per hour** untreated. **Immediate operative repair** is indicated, including when there is renal, mesenteric, or lower-extremity malperfusion.

TYPE B — descending only, distal to left subclavian

Medical therapy is first-line for uncomplicated disease. **Intervene** for rupture, branch occlusion with malperfusion, dissection extension, progressive aortic enlargement, **intractable pain, or uncontrolled hypertension**. TEVAR is preferred over open repair with suitable anatomy.

MEDICAL MANAGEMENT *the order of drugs matters more than the drugs*

1. **Beta-blocker FIRST** — IV esmolol, labetalol, or metoprolol. Target **heart rate 60–80/min**. Lowering rate lowers dP/dt, the shear force propagating the dissection.
2. **Then add a vasodilator** if pressure remains high — nicardipine or nitroprusside. Target **SBP < 120 mmHg**, or the lowest pressure that still perfuses brain, kidneys, and gut.
3. **Never give a vasodilator before rate control.** Unopposed vasodilation causes reflex tachycardia, raises dP/dt, and can extend the dissection.
4. **Analgesia** — IV opioid. Pain drives catecholamines, tachycardia, and hypertension, so treating it is part of the hemodynamic plan.
5. **If beta-blockade is contraindicated** (severe asthma, high-grade block), use a non-dihydropyridine calcium channel blocker such as diltiazem or verapamil for rate control.

WHEN NOT TO LOWER THE PRESSURE

If the patient is **hypotensive or in shock**, think **tamponade, aortic rupture, or severe AR** — not overtreatment. Resuscitate, get an emergent echo, and go to the operating room. **Do not perform pericardiocentesis** for tamponade from type A dissection unless in extremis; draining it can worsen bleeding. The fix is surgical.

LONG-TERM *this is a lifelong aortic disease*

Element	Detail
Beta-blockade for life	Long-term beta-blockers are recommended after the initial treatment of an acute aortic syndrome. Target strict BP control.
Surveillance imaging	CT or MR at intervals after discharge, then lifelong, watching for aneurysmal degeneration of the false lumen.
Screen the family	First-degree relatives of patients with heritable thoracic aortic disease should be screened. Ask about Marfan, Loeys-Dietz, vascular Ehlers-Danlos, and bicuspid aortic valve.
Activity	Avoid heavy isometric lifting and competitive/contact sport, which spike aortic wall stress.

MALPERFUSION — WHICH BRANCH IS THE FLAP OCCLUDING *this is how dissection kills organs*

Territory	How it presents	What it changes
Coronary	Inferior STEMI pattern — the flap most often involves the **RCA ostium**	**Do not thrombolyse or fully anticoagulate.** This is the single most lethal misdiagnosis in dissection.
Cerebral / carotid	Stroke, syncope, or depressed consciousness at onset	Chest pain with a focal deficit means CT angiography of the aorta, not a lone stroke pathway.
Spinal	**Paraplegia** or sensory level from artery of Adamkiewicz involvement	Painless leg weakness after chest pain is dissection until excluded.
Renal	AKI, oliguria, **severe renin-mediated hypertension**	Pressure that will not come down despite adequate therapy may be renal malperfusion, not undertreatment.
Mesenteric	**Pain out of proportion** to exam, rising lactate	High mortality. An indication for urgent intervention in type B disease.
Limb	Cold, pulseless, painful extremity	Document pulses in all four limbs on arrival, and recheck — the flap can move.

WHILE YOU WAIT FOR THE SURGEON *parallel tasks, not sequential*

RESUSCITATION SETUP

Two large-bore IVs, arterial line (use the arm with the **higher** pressure), continuous ECG. **Type and crossmatch 4–6 units.** Keep the patient NPO. Send CBC, chemistry, lactate, troponin, and coagulation studies.

DO NOT

Do not give **thrombolytics** or therapeutic anticoagulation. Do not delay CT angiography for a D-dimer. Do not let a normal ECG or chest X-ray reassure you. Do not start a vasodilator before rate control.

PEARLS & PITFALLS

- **Dissection can cause a STEMI** when the flap occludes a coronary, usually the RCA giving an inferior pattern. **Thrombolysis or full anticoagulation here is catastrophic.**
- Never exclude dissection on a normal D-dimer or a normal chest X-ray. A widened mediastinum is neither sensitive nor specific.
- Pain that migrates from chest to back to abdomen is dissection until proven otherwise.
- **Rate before pressure, always.** Nitroprusside first is a classic and harmful error.
- Check BP in **both arms** and document it. A differential can be the only physical clue.
- Syncope, stroke, or acute limb ischemia with chest pain should trigger CT angiography, not a stroke pathway alone.

References: 2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease (Circulation, 2022) · International Registry of Acute Aortic Dissection (IRAD).

Educational aid; verify doses against local protocol and patient factors.