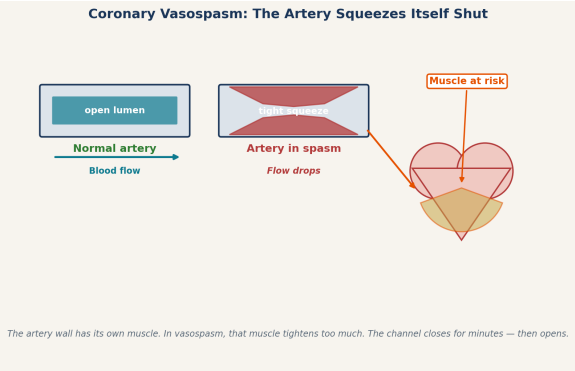
Coronary Vasospasm

Prinzmetal / Variant Angina - When a Heart Artery Squeezes Itself

The artery wall has its own muscle. When it tightens too much, blood flow drops. Daily prevention plus trigger removal is the plan.



Online: https://go.riasalimd.com/cv-guide

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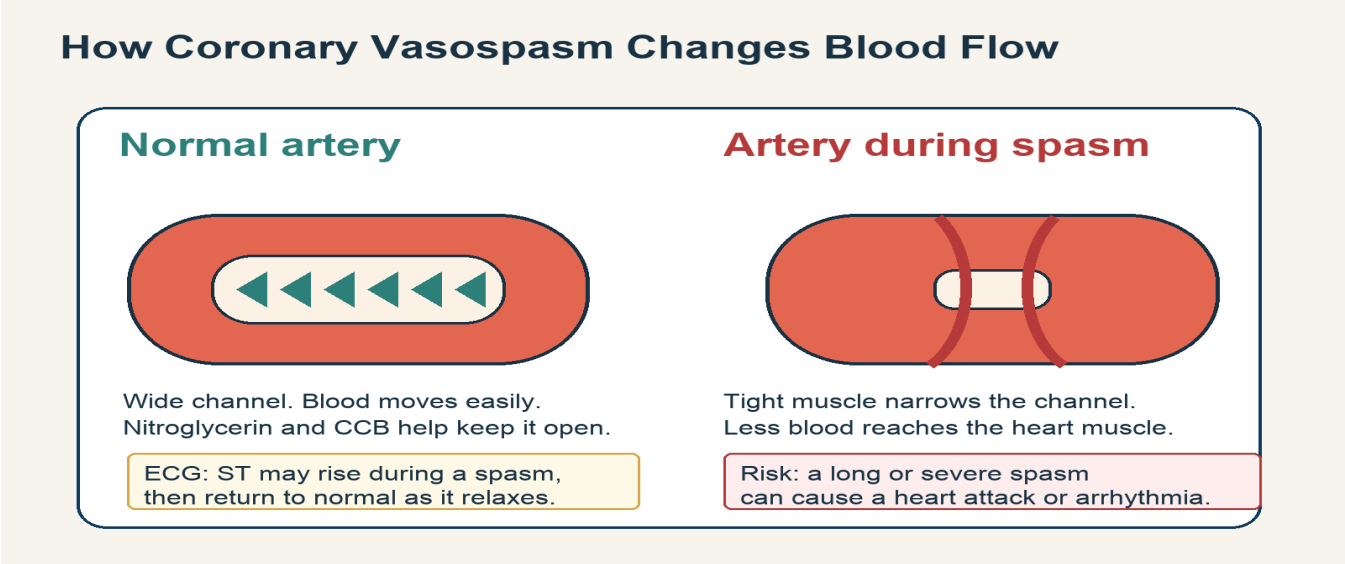
Names & Terms You Will Hear

Term	Meaning
Coronary vasospasm	A sudden, brief squeeze of a heart artery. Blood flow drops for a few minutes. The artery then opens up on its own.
Prinzmetal angina	The older name for vasospastic angina. Named after Dr. Myron Prinzmetal, who described chest pain at rest in 1959.
Variant angina	Another name for vasospasm. 'Variant' because it does not match the classic exercise-driven pattern of stable angina.
Vasospastic angina	The modern name. The condition is a kind of angina (chest pain) caused by spasm, not by a fixed plaque blockage.
Epicardial spasm	Spasm of a large heart artery on the surface of the heart. Confirmed with a dye study during a cath.
Microvascular spasm	Spasm of the tiny arteries deep in the heart muscle. They are too small to see on a regular dye study.
Acetylcholine provocation	A test done during a cath. Acetylcholine is given into the artery to see if it triggers a spasm. The most sensitive test for vasospasm.
Ergonovine challenge	An older provocation test. Ergonovine is given to see if a heart artery clamps down. Used less today, but still valid.
Calcium channel blocker (CCB)	The main daily medicine for vasospasm. Amlodipine, diltiazem, and verapamil are common choices. They relax artery wall muscle.
Radial artery spasm	A related vasomotor problem. The wrist artery clamps down during a cath. Patients with coronary vasospasm are at higher risk.
ANOCA / INOCA	Angina or ischemia with no major artery blockage. Vasospasm and microvascular disease are the two main causes.
Nitroglycerin	A short-acting medicine that relaxes the artery muscle. Used to stop an acute attack.

Call 911 now if you have chest pain that lasts more than a few minutes - or that does not ease after 1-2 doses of nitroglycerin. Call right away if it comes with fainting, shortness of breath, a cold sweat, or a racing heartbeat. **Do not drive yourself.** A long spasm can cause a heart attack or a dangerous rhythm.

Coronary Vasospasm?

- Coronary vasospasm is a brief, intense squeeze of a heart artery. Blood flow drops for a few minutes.
- There is no fixed plaque blockage causing it. The artery wall muscle is the problem.
- Attacks often happen at rest. Many strike at night or early in the morning.
- The classic symptom is chest pressure, burning, or squeezing. Pain may spread to the arm, jaw, neck, or back.
- A spasm can cause a heart attack, a fainting spell, or a dangerous rhythm in some patients.
- Doctors call this Prinzmetal angina, variant angina, or vasospastic angina. The three names mean the same thing.
- The condition is missed often. A normal stress test or angiogram does NOT rule it out.



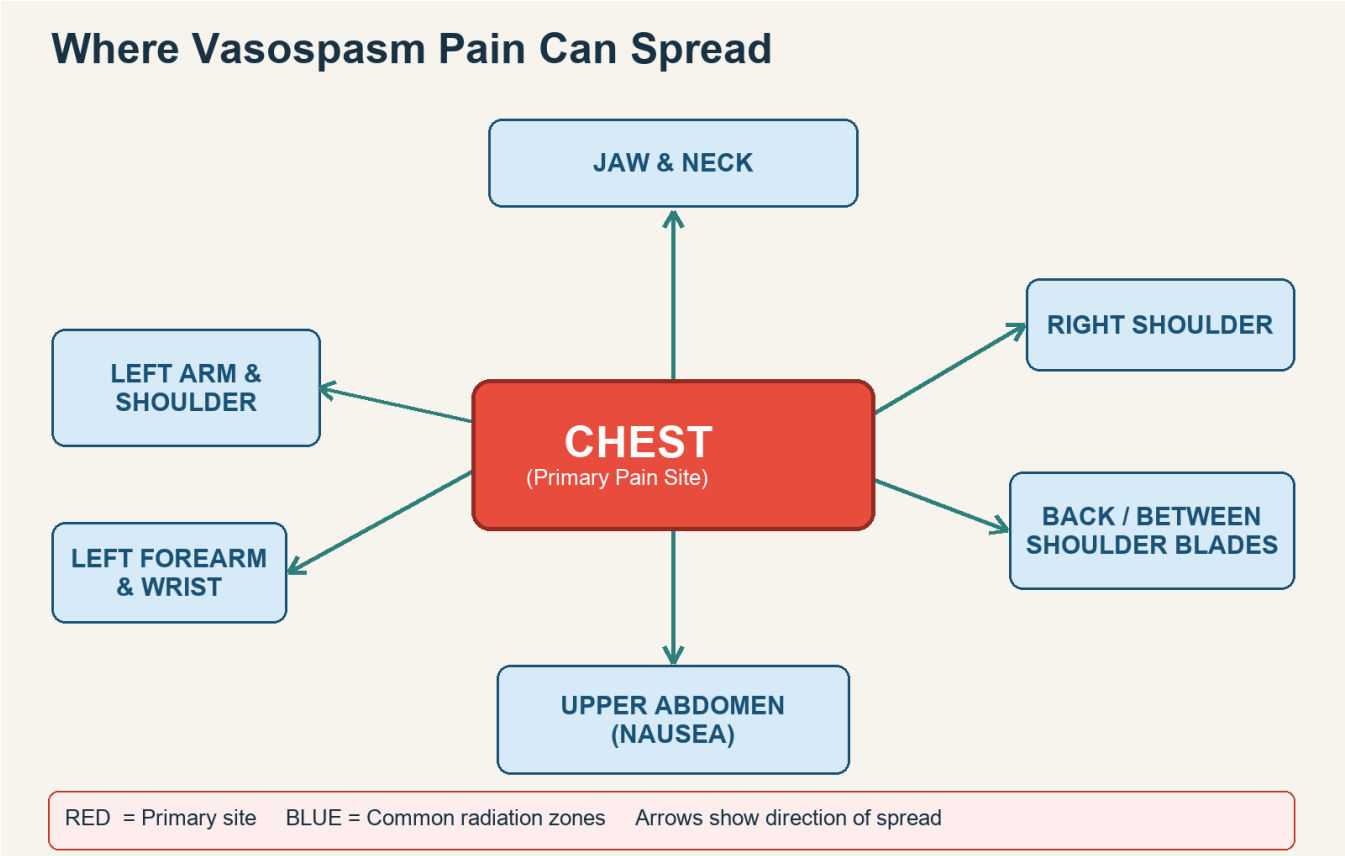
Normal artery on the left, artery in spasm on the right. The squeeze cuts blood flow for a few minutes, then the artery opens again.

When the Attack Hits - What to Do in the Moment

- Stop what you are doing. Sit or lie down somewhere safe.
- Take rescue nitroglycerin if your doctor has prescribed it. Place a tablet or spray under your tongue.
- Wait 5 minutes. If pain is not gone, call 911. Do not drive.
- If you have a second dose, take it after the 5-minute wait only if 911 or your clinician says it is safe.
- Tell the ER team you have vasospasm. Show them this guide if you can. It changes how they treat you.
- Avoid beta-blockers in the ER, especially propranolol. Ask for a calcium channel blocker instead.

Why It Matters

- A normal ECG and a clean angiogram do not rule out vasospasm. Many patients are told 'your heart is fine' when it is not.
- Smoking is the strongest known trigger. Quitting cuts attacks more than any pill.
- Some attacks are 'silent.' Studies show 37-71% of ischemic episodes in variant angina cause no chest pain.
- A silent spasm can still injure the heart. Do not assume you are safe just because you feel no pain.
- Daily calcium channel blockers cut attack rate. Stopping them on your own can let attacks come back.
- Beta-blockers can make vasospasm worse. Tell every new clinician you have this diagnosis.
- Cocaine, amphetamines, decongestants, and triptans can all trigger an attack. Share your full drug list.
- Most patients do well once the disease is named and treated. The key is to get the diagnosis right.



The chest is the main pain site. Pain can spread up to the jaw or neck, down the left arm, into the back, or down to the upper belly.

A normal angiogram does NOT rule out vasospasm. Up to 40% of patients with chest pain and clean arteries have epicardial spasm on provocation testing. Another 24% have microvascular spasm. If your dye study is clean but the pain is real, ask about a provocation test.

Three Patterns of Coronary Vasospasm

Focal epicardial spasm	Diffuse epicardial spasm	Microvascular spasm
• A short, tight squeeze of one segment of a large heart artery.	• A longer, more spread-out squeeze. Several segments tighten at once.	• Spasm of the tiny arteries deep in the heart muscle.
• Seen on the dye study during an attack.	• More likely to cause longer attacks and silent ischemia.	• Too small to see on a regular dye study.
• Classic ECG: brief ST elevation that fades as the artery opens.	• Can be missed if the cath is done between attacks.	• Picked up by symptom + ECG response during acetylcholine testing.
• Best confirmed with acetylcholine provocation.	• Often needs a higher CCB dose or a second drug.	• Treated with the same CCB-first playbook.

Risk Factors

Some patients are more likely to develop this condition. Knowing your risk helps your care team take extra precautions.

Risk Factor	Why It Increases Risk
Smoking and nicotine in any form	Tobacco and nicotine injure the artery lining. They are the single highest-value modifiable risk.
Cocaine, amphetamines, and other stimulants	These drugs make heart arteries clamp down. They can trigger an attack even in young, healthy people.
Cold exposure	Cold air tightens artery wall muscle. Plunging into cold water or a cold morning walk are common triggers.
Emotional stress and sleep loss	Surges of stress hormones can trigger an attack. Poor sleep raises the daily risk.
Heavy alcohol use	Binge drinking and alcohol withdrawal can both trigger spasm.
Vessel-tightening medicines	Decongestants, triptans, ergot drugs, and some testosterone or anabolic agents can all set off an attack.
Migraine and Raynaud disease	Both involve over-reactive smooth muscle in artery walls. They share the same biology as vasospasm.
Low magnesium	Low blood magnesium has been linked to higher attack rates in some patients.

Common Triggers of Coronary Vasospasm

* Decongestants, triptans, anabolic agents, cocaine, amphetamines — share your full drug list.

The six most common trigger groups. Tell your clinician about every drug, supplement, and exposure - even the ones that seem unrelated.

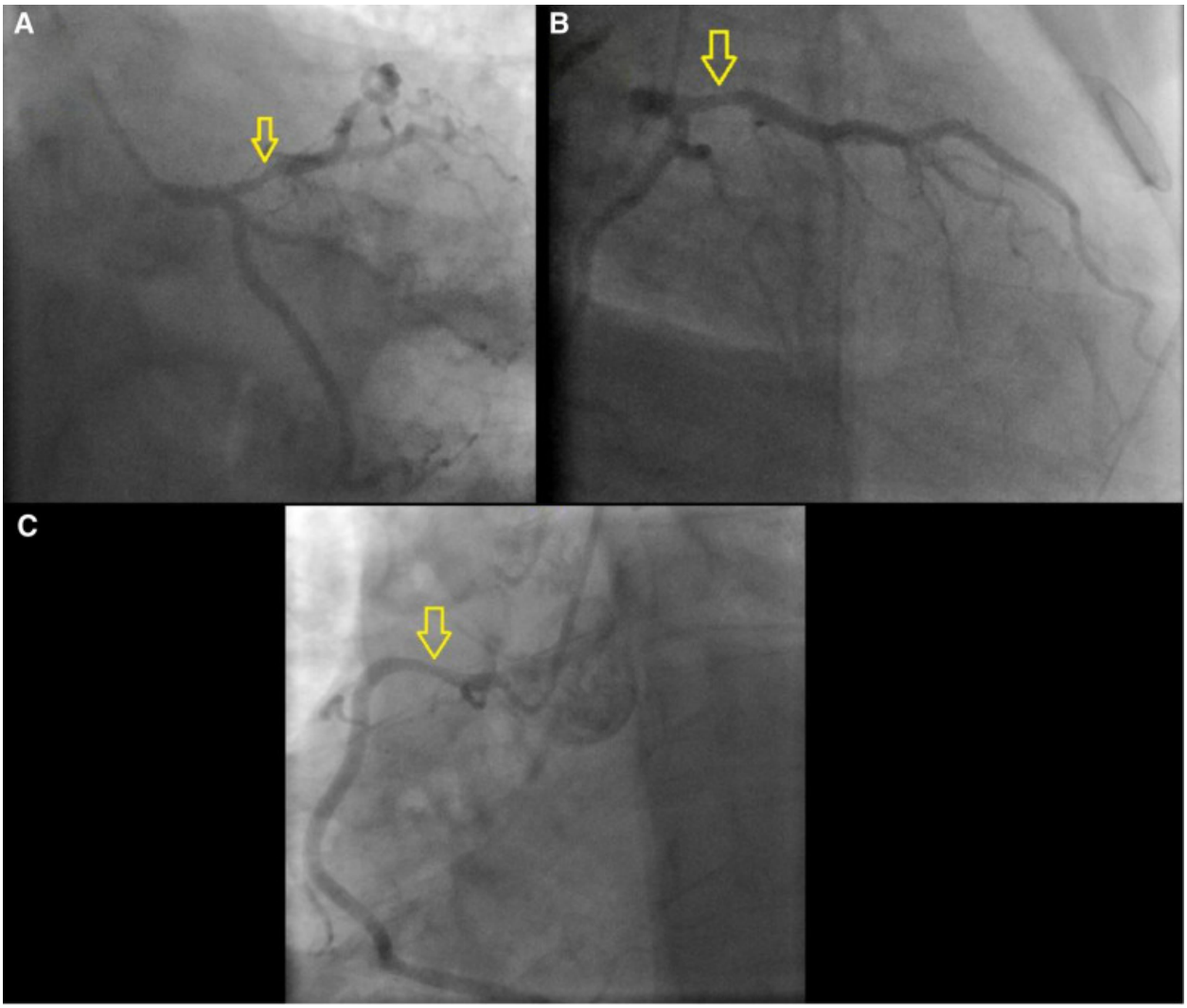
Two Provocation Tests - How the Cath Team Confirms Spasm

Test agent	How it works	Strengths	Limits
Acetylcholine	Given into the heart artery during a cath. Triggers a spasm if the artery is over-reactive.	Most sensitive test. Picks up both epicardial and microvascular spasm.	Needs an experienced operator. Brief provoked spasm can feel uncomfortable.
Ergonovine	An older agent. Tightens artery wall muscle. Watched on ECG and angiogram.	Still valid. Useful if acetylcholine is not available.	Less sensitive than acetylcholine. Withdrawn in some countries.
Hyperventilation	Patient breathes fast for 5 to 6 minutes. Watched on ECG.	Non-invasive. Can be a screening tool.	Less sensitive than cath-based testing. Best used as a first step.

Treatment Options

- Quit smoking and vaping. The single most powerful change you can make.
- Take a daily calcium channel blocker. Amlodipine, diltiazem, and verapamil are common choices.
- Take it every day, even when you feel well. Stopping on your own lets attacks come back.
- Carry rescue nitroglycerin if prescribed. Use it at the FIRST sign of an attack.
- NEVER mix nitroglycerin with sildenafil, tadalafil, vardenafil, or riociguat. The mix can drop blood pressure dangerously low.
- Add a long-acting nitrate if a CCB alone is not enough. Your doctor will schedule a nitrate-free interval each day.
- Treat sleep apnea, control blood pressure, and limit alcohol.
- Avoid decongestants, triptans, and stimulant drugs. Ask your pharmacist before any new over-the-counter pill.
- Beta-blockers are NOT routine for vasospasm. Non-selective ones (propranolol, carvedilol) can make spasm worse.
- A stent does NOT fix pure vasospasm. Stents are used only when a real plaque blockage is also present.

Start with trigger removal. Add a calcium channel blocker. Add a long-acting nitrate if needed. Escalate to a specialist if attacks keep breaking through.



A real coronary angiogram showing vasospasm (arrows) in three views before treatment — the artery clamps down and narrows sharply, then opens back up after medicine relaxes it. Image: Abboud et al., Medicine (Baltimore) 2025 (CC BY 4.0).

The Calcium Channel Blocker Playbook

- First-line: amlodipine, diltiazem, or verapamil. Your doctor picks one based on your pulse and blood pressure.
- Diltiazem and verapamil also slow the pulse. Useful if your resting pulse is fast. Avoid in slow-pulse patients.
- Amlodipine does not slow the pulse. Good first choice when the pulse runs slow.
- Take it every day, even when you feel well. Stopping it on your own often lets attacks come back.
- Side effects: low blood pressure, ankle swelling, constipation. Call us if these are bothersome.
- If a single CCB is not enough, your doctor may add a long-acting nitrate or switch to a dual-CCB strategy.

Where Vasospasm Fits with the Rest of Your Heart Care

- Chest pain has many causes. Vasospasm is one of several patterns. We have separate guides for each piece.
- How chest pain is sorted out: see the Chest Pain guide.
- Plaque-driven artery disease: see the Coronary Artery Disease guide.
- A torn artery (more often in younger women): see the SCAD guide.
- Heart attack and the ACS spectrum: see the Heart Attack guide.
- Tiny-vessel ischemia with clean arteries: see the Coronary Microvascular Dysfunction guide.
- Fast or chaotic lower-chamber rhythms: see the VT/VF guide.
- When the heart suddenly stops: see the Sudden Cardiac Arrest guide.

Never mix nitroglycerin with these pills. Sildenafil (Viagra), tadalafil (Cialis), vardenafil (Levitra), and riociguat (Adempas) can all drop blood pressure to a dangerous level when combined with nitrates. If you take any of these, tell every doctor, dentist, and ER team.

Risks, Benefits, and Alternatives

Every choice has trade-offs. Use this table to start the shared decision conversation.

Option	Risks	Benefits	Alternatives
Daily calcium channel blocker (CCB)	Low blood pressure, ankle swelling, constipation. Diltiazem and verapamil can slow the pulse.	First-line prevention. Cuts attack rate and severity. Often enough on its own.	Long-acting nitrate alone (less effective). Trigger removal alone, only if disease is very mild.
Provocation test in the cath lab (acetylcholine or ergonovine)	Small procedural risk. Rare provoked spasm with rhythm changes. Dye exposure to the kidneys.	Confirms the mechanism. Guides targeted treatment. Avoids needless stenting.	Empirical CCB trial. Holter or event monitor. More non-invasive testing.
Add a long-acting nitrate	Headache (common), low BP, tolerance over time. Needs a daily nitrate-free interval.	Cuts attacks that break through CCB therapy. May improve exercise tolerance.	Dual CCB therapy. Statin if a lipid reason exists. Specialist review.
Implantable defibrillator (ICD)	Surgical risk. Lead fracture, infection, or rare wrong shocks. Emotional impact of the device.	May prevent sudden cardiac death if a dangerous rhythm came with the spasm.	Maximize CCB and nitrate first. EP specialist review. Wearable defibrillator as a short-term bridge.
Beta-blocker in a vasospasm patient	May worsen or unmask spasm. Non-selective agents are the riskiest (propranolol, carvedilol).	Treats a coexisting reason - post-MI, heart failure, or high blood pressure.	Prefer a CCB whenever possible. If a beta-blocker is needed, use a heart-selective one with close follow-up.

Common Misconceptions

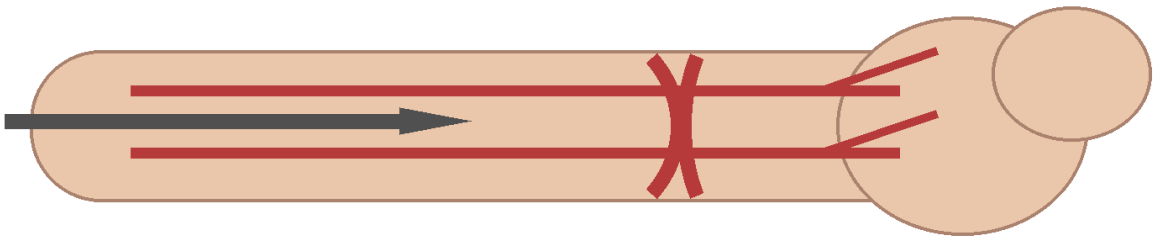
Myth	Reality
A normal angiogram means my chest pain is not from my heart.	Vasospasm and microvascular angina both cause real ischemia with a normal-looking dye study.
Nitroglycerin cures the disease.	Nitroglycerin ends an acute attack. It does not prevent the next one. Daily prevention is still needed.
Only older adults with blocked arteries get vasospasm.	Younger adults get it too. Many have little or no plaque at all.
If the last ECG was normal, my heart is fine.	The ECG and stress test are often normal between attacks. They do not rule out vasospasm.
A stent will fix this.	A stent does not fix the muscle in the artery wall. Stents are used only when a real plaque blockage is also there.
Beta-blockers are good for any heart problem.	Beta-blockers can make vasospasm worse. Non-selective ones are the riskiest.
No chest pain means no spasm.	Many attacks are silent. The first sign may be an abnormal stress test or a Holter finding.
Once attacks stop, I can stop my medicine.	Stopping a CCB on your own often brings attacks back. Always ask your doctor first.

Possible Complications

Knowing what can go wrong helps you spot problems early. Most complications are uncommon, especially with treatment.

Where / What	What Can Happen
Heart attack	A long or severe spasm can cause a true heart attack. Heart muscle can be injured even with no plaque.
Ventricular tachycardia or fibrillation (VT/VF)	A spasm can trigger a fast or chaotic rhythm. This is the main cause of sudden death in vasospasm.
Sudden cardiac arrest	Rare but serious. Carry a medical ID and tell loved ones the diagnosis.
Syncope (passing out)	Some spasms drop blood pressure or trigger a brief rhythm change. Fainting can follow.
Silent ischemia	Spasms that cause no pain but do injure the heart. Found on Holter monitors or routine ECGs.
Radial artery spasm during a wrist cath	Patients with coronary vasospasm have a higher chance of this. Tell your interventional team.
Refractory disease	Attacks that keep coming despite maximal medicines. Needs specialist review and possible dual-CCB therapy.

Radial Artery Spasm During Wrist Catheterization



The sheath rubs the artery wall. The smooth muscle tightens. Spasm.

Prevention: Vasodilator cocktail (NTG + verapamil) through the sheath.

Prevention: Hydrophilic sheath, calm patient, warm arm, right sheath size.

Treatment: More nitroglycerin or verapamil through the sheath.

Tell your team: Vasospasm history or prior tough wrist access.

The wrist artery can also clamp down during a cath. Patients with coronary vasospasm are at higher risk for this. Always tell your team in advance.

Silent ischemia matters. In variant angina, 37 to 71% of ischemic episodes have no chest pain at all. Silent attacks still injure the heart and still carry risk. Do not assume you are safe just because you feel fine.

Points to Know

If you remember nothing else, remember these key points.

- Vasospasm can cause chest pain even when your arteries have no plaque. A normal angiogram does not rule it out.
- Calcium channel blockers are first-line. Beta-blockers, especially non-selective ones, can make spasm worse.
- Common triggers: cold, stress, cocaine, triptans, smoking, decongestants. Find yours and avoid them.
- Acetylcholine or ergonovine provocation in the cath lab is the gold-standard test when the diagnosis is unclear.
- Long-acting nitrates can help. Tolerance can develop, so your doctor plans a daily nitrate-free interval.
- Quit smoking. It is the strongest modifiable trigger.
- Spasm can hit any heart artery. It can also affect the wrist artery during a cath.
- Some spasms are silent. Tell your doctor about any abnormal stress test, Holter ECG, or routine ECG change.
- Call 911 for chest pain that lasts longer than 5 minutes or that does not stop after 1-2 doses of nitroglycerin.

When to Call Us - and When to Call 911

If you are not sure, call. We would rather hear from you twice than miss a real problem.

- Chest pain that lasts more than 5 minutes or that does not ease after 1-2 sublingual nitroglycerin doses - call 911.
- Chest pain with fainting, severe shortness of breath, sweating, or arm or jaw pain - call 911.
- A new fast or irregular heartbeat with chest pain - call 911.
- More attacks than usual, longer attacks, or attacks at lower exertion - call our office the same week.
- A new prescription or over-the-counter medicine that could trigger spasm - call us before starting it.
- Plans for a wrist cath or any heart procedure - tell every team you have vasospasm and any Raynaud or migraine history.
- Side effects from your CCB - ankle swelling, dizziness, constipation, very slow pulse - call us; do not stop on your own.
- Trouble paying for your medicines - call us; we can adjust the plan or help with assistance programs.

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Trusted Resources

The links below are the trusted resources Dr. Ali used to write this guide and that he recommends you visit for more information. Each is a clickable link in the digital version and a Short.io tracked URL on the printed version.

- American Heart Association - Angina - AHA plain-language angina page. Includes a short Watch, Learn and Live animation.
- Mayo Clinic - Coronary Artery Spasm - Mayo Clinic patient page on coronary artery spasm. Brief, clear Q&A; format.
- Cleveland Clinic - Prinzmetal (Variant) Angina - Cleveland Clinic overview. Covers symptoms, tests, and treatment options.
- MedlinePlus - Angina - US National Library of Medicine angina topic page. Links to more NIH/NHLBI resources.
- AAFP - Variant (Prinzmetal) Angina - American Academy of Family Physicians clinical review. Plain-language framing of variant angina.
- ESC 2024 - Chronic Coronary Syndromes Guideline - European guideline. Has a clear section on vasospastic angina and the ANOCA/INOCA framework.

Sources Used to Build This Guide

Every recommendation in this guide is grounded in one or more of the studies, guidelines, or trusted resources below. Short links are tracked so Dr. Ali can see which references patients are reading; nothing personally identifying is captured.

- 2024 ESC Chronic Coronary Syndromes guideline page *[Guideline]*
  Current guideline framework; highlights expanded ANOCA-INOCA section.
- Coronary Vasospastic Angina: A Review of the Pathogenesis, Diagnosis, and Management *[Review]*
  Pathogenesis, symptoms, diagnosis, management, prognosis.
- Vasospastic angina: Past, present, and future *[Review]*
  Natural history, refractory disease, arrhythmia risk.
- Prevalence of Coronary Microvascular Disease and Coronary Vasospasm in Patients With Nonobstructive CAD *[Meta-Analysis]*
  Pooled prevalence estimates for epicardial and microvascular spasm.
- Radial Artery Spasm—A Review on Incidence, Prevention and Treatment *[Review]*
  Incidence and prevention of radial artery spasm in transradial procedures.
- Mayo Clinic: Coronary artery spasm: Cause for concern? *[Patient Education]*
  Plain-language symptom and trigger phrasing for patient-facing copy.
- Mayo Clinic coronary artery spasm image page *[Patient Education Graphic Link]*
  Official anatomy reference link for patients.
- MedlinePlus Angina *[Patient Education]*
  General chest pain explanation and additional official patient links.
- American Heart Association stable angina page *[Patient Education]*
  Official general angina animation/resource pathway.
- American Heart Association heart attack overview *[Patient Education]*
  Official patient-facing explanation that coronary spasm can cause heart attack.
- Lanza GA et al. Autonomic changes associated with spontaneous coronary spasm in variant angina. JACC 1996. PMID 8890823. *[Original Research (Jacc)]*
  Holter monitoring of 23 variant angina patients showed 39% of ischemic episodes were silent (no chest pain). Supports silent ischemia content.
- Tomita F. Characteristics and clinical significance of silent myocardial ischemia during ambulatory ECG monitoring. Hokkaido J Med Sci 1990. PMID 2265819. *[Original Research]*
  In variant angina, 71% of transient ST deviations were asymptomatic. Asymptomatic episodes carry comparable severity and prognostic risk as symptomatic ones.
- Bia E, Lanza GA et al. Neurovegetative changes before and during episodes of silent ischemia in variant angina. Cardiologia 1994. PMID 7923252. *[Original Research]*
  37% of ischemic episodes in variant angina patients were silent on 24-hour Holter. Duration and magnitude comparable to symptomatic episodes.

About This Guide

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Reviewer note: Reviewed against AHA, Mayo Clinic, Cleveland Clinic, AAFP, and the 2024 ESC Chronic Coronary Syndromes guideline. Ours adds: a normal vs spasm artery diagram, a trigger wheel, a pain-radiation map, a step-up treatment ladder, a wrist-access (radial spasm) panel, and an RBA table that names the ergonovine and acetylcholine provocation studies in plain English.

Disclaimer

This guide is for educational purposes only and does not replace medical advice from your physician. Recommendations may not apply to every patient. Always follow the specific instructions of Dr. Ali and your care team. In an emergency call 911 or go to the nearest emergency department.

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