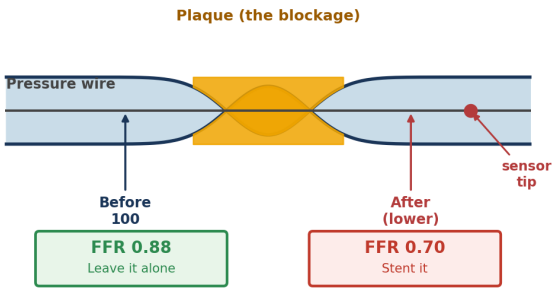
Understanding FFR and iFR

The pressure wire that checks if a blockage really needs a stent

A blockage that looks scary on the picture may not be limiting blood flow. The wire tells the truth.



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

Rias KS Ali, MD FACC

Board Certified in Interventional Cardiology & Cardiovascular Disease

4740 Mile Stretch Drive, Holiday FL 34690 | Office: (727) 943-5200 | Fax: (727) 943-5201 | RiasAliMD.com

Last Updated: August 2026

Names & Terms You Will Hear

Term	Meaning
FFR (Fractional Flow Reserve)	A pressure-wire test done during an angiogram. It measures how much a blockage limits blood flow. A medicine (adenosine) is given to open the small vessels first.
iFR (Instantaneous Wave-Free Ratio)	A newer pressure-wire test. It gives the same kind of answer as FFR but does not need the adenosine medicine. The reading is taken during one resting phase of the heartbeat.
Pressure wire	A very thin wire with a tiny sensor on the tip. The doctor passes it across the blockage to measure pressure on both sides.
Coronary physiology	The medical term for measuring blood flow in the heart's arteries, not just looking at the picture.
Hemodynamically significant	A blockage that is bad enough to actually starve the heart muscle of blood. This is what the wire is testing for.
Ischemia	When heart muscle does not get enough blood. A flow-limiting blockage causes ischemia and can cause chest pain.
RFR, DFR, dPR	Other resting wire scores, similar to iFR. They use the same idea and similar cutoffs. Your lab may use one of these.

What Is FFR and iFR?

- FFR and iFR are tests done during a coronary angiogram (a dye picture of the heart's arteries). They are not separate appointments.
- An angiogram shows what a blockage looks like. But the picture can fool the eye. A blockage can look severe and still let plenty of blood through, or look mild and still cause trouble.
- The pressure wire settles the question. The doctor threads a thin wire with a sensor across the blockage and measures the pressure before and after it.
- FFR uses a medicine called adenosine to make the heart's small vessels open wide. This shows the worst-case flow. The brief medicine can cause a few seconds of chest tightness or flushing.
- iFR skips the medicine. It reads the pressure during a quiet part of each heartbeat instead. The result guides the same stent-or-not decision.
- The score is a ratio. A perfect artery scores 1.00. The lower the number, the more the blockage is choking off blood flow.

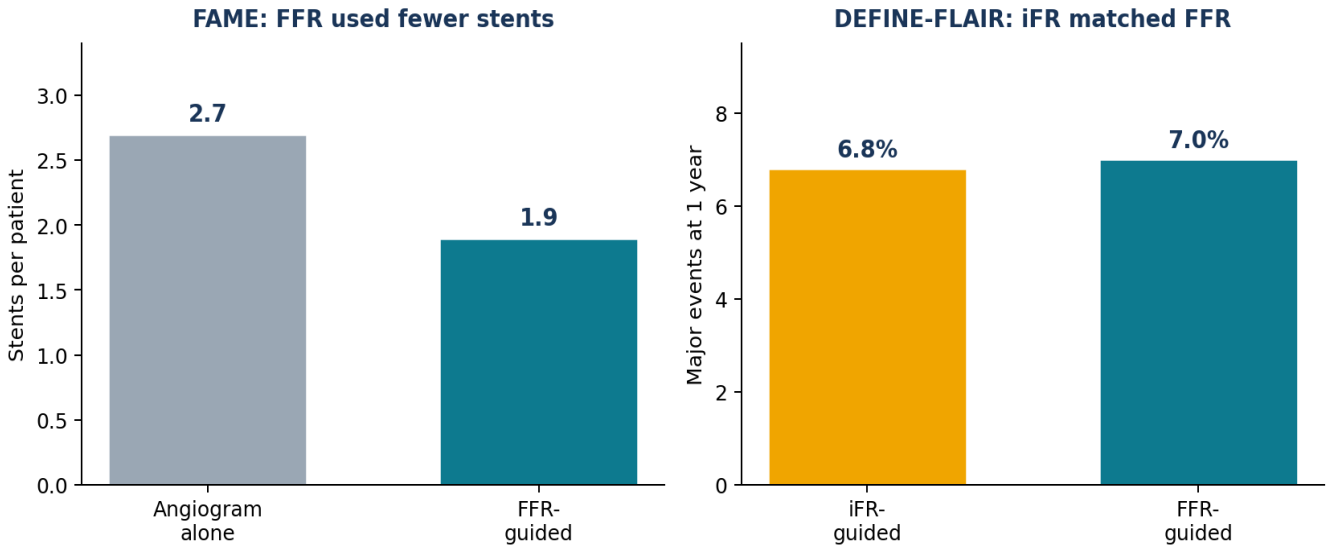
FFR vs iFR — Side by Side

	FFR	iFR
Full name	Fractional Flow Reserve	Instantaneous Wave-Free Ratio
Needs adenosine medicine?	Yes	No
When the reading is taken	After medicine opens small vessels	During a quiet part of the heartbeat
Failing score (treat it)	At or below 0.80	At or below 0.89
Passing score (leave alone)	Above 0.80	Above 0.89
Key trials	FAME, FAME 2	DEFINE-FLAIR, iFR-SWEDEHEART

Lower is worse, not better. It feels backward, but a perfect artery scores 1.00. The lower the wire number, the more the blockage is choking off blood flow. So a low score fails and usually means a stent, while a high score passes and is safe to leave on medicine.

Why It Matters

- Stenting a blockage that is not limiting blood flow does not help, and it adds the small risks of the stent plus a lifetime of blood-thinner pills. The wire helps avoid stents you do not need.
- Missing a blockage that IS limiting flow leaves you at risk for chest pain and heart damage. The wire helps catch the ones that truly need treatment.
- Many blockages fall in a borderline range on the picture (about 40 to 70 percent narrowed). The eye cannot tell which of these matter. The wire can.
- In the FAME trial, using FFR to guide stenting led to fewer stents AND fewer heart attacks and deaths over the next year than relying on the picture alone.
- The chart below shows the two ideas behind these tests: fewer unnecessary stents, with the same safety whether your lab uses FFR or iFR.



Left: in FAME, using FFR led to fewer stents per patient. Right: in DEFINE-FLAIR, iFR matched FFR for safety at one year.

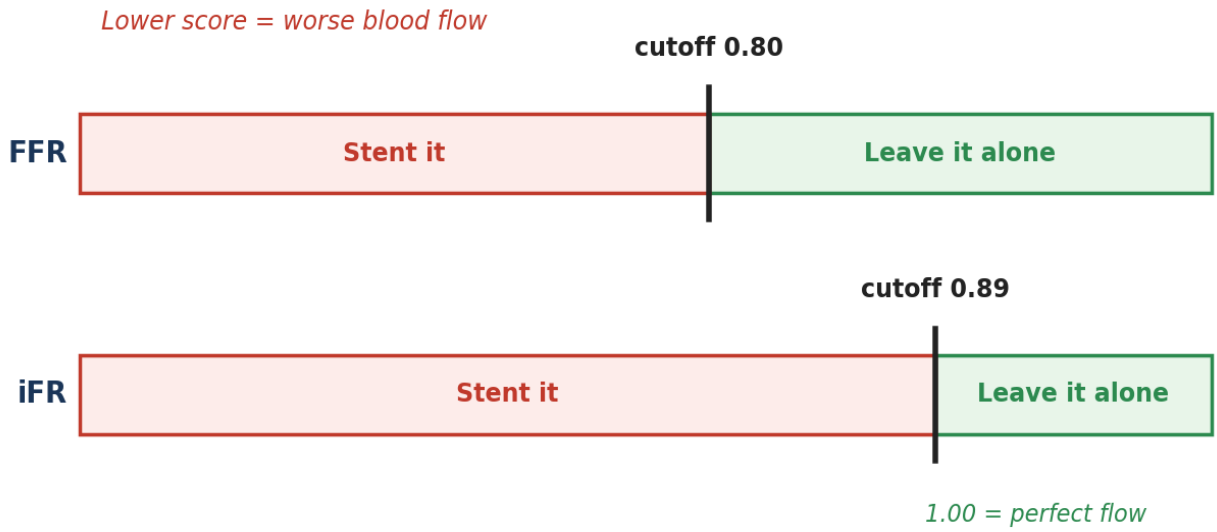
Risk Factors

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
A borderline blockage on the angiogram	When a narrowing is in the 40 to 70 percent range, the picture alone cannot tell if it limits flow. The wire is most useful here.
More than one blockage	When several arteries have plaque, the wire helps pick which ones truly need a stent and which can wait on medicine.
Chest pain with unclear cause	If symptoms do not match what the picture shows, the wire helps confirm whether a blockage is the real culprit.
Deciding stent versus bypass	The wire helps the Heart Team count how many arteries are truly flow-limiting, which guides the choice between stents and bypass surgery.

Treatment Options

- The wire test itself takes only a few extra minutes during your angiogram. You stay awake, and most people feel little or nothing from the wire.
- If FFR is at or below 0.80 (or iFR at or below 0.89), the blockage is limiting blood flow. Your doctor will usually treat it, often with a stent during the same procedure.
- If the score is above the cutoff, the blockage is not limiting flow. It is safer to leave it alone and treat with medicine, such as a statin, aspirin, and blood-pressure control.
- Leaving a non-flow-limiting blockage alone is not 'doing nothing.' Good medicine plus healthy habits is the proven treatment for these blockages.
- If a stent is placed, you will take a blood thinner for a set time to keep the stent open. Your doctor will tell you exactly how long.
- See our guides on coronary artery disease, the coronary angiogram, and angioplasty and stents for the bigger picture.



The score is a number line. FFR fails at or below 0.80; iFR fails at or below 0.89. Red means stent it; green means leave it alone.

If Your Score Fails — A Stent Is Likely

- A failing score means the blockage is starving the heart muscle of blood.
- Your doctor will usually place a stent during the same procedure, so you avoid a second trip.
- You will take a blood thinner for a set time to keep the stent open. Do not stop it without asking.
- Treating a flow-limiting blockage can ease chest pain and lower the risk from that lesion.

If Your Score Is Borderline — The Gray Zone

- Scores just around the cutoff are a close call. The wire is one piece of the picture.
- Your doctor also weighs your symptoms, which artery it is, and how much muscle it feeds.
- Sometimes a repeat reading or a second test helps settle a borderline result.
- Shared decision-making matters most here. Ask what tips the balance in your case.

If Your Score Passes — Medicine Is the Plan

- A passing score means the blockage is not limiting blood flow right now.
- The proven treatment is medicine and healthy habits, not a stent.
- This is backed by trials: stenting these blockages does not lower risk and adds the stent's downsides.
- Your team will recheck if your symptoms change. A passing score today can be re-tested later.

What Your Score Means — At a Glance

Clearly fails	Gray zone	Clearly passes
• FFR 0.75 or lower	• FFR 0.76 to 0.80	• FFR above 0.80
• iFR 0.85 or lower	• iFR 0.86 to 0.89	• iFR above 0.89
• Flow is limited	• Borderline result	• Flow is fine
• Stent is usually advised	• Decision weighs symptoms	• Leave it on medicine

Comfort Measures at Home (No Medication Needed)

These simple steps support healing and ease symptoms. Use them alongside any medication your doctor prescribes.

- Tell the team if you feel short of breath, flushed, or chest tightness during the adenosine. It passes within seconds once the medicine stops.
- Hold still during the few seconds the reading is taken. Staying relaxed gives a cleaner number.
- Keep the wrist or groin access site still and flat afterward, as the team instructs, to prevent bruising.
- Drink fluids after the procedure to help your kidneys clear the dye, unless you are told to limit fluids.
- Bring a written list of your questions. Ask what your score was and what it means for your plan.

Risks, Benefits, and Alternatives

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

Option	Risks	Benefits	Alternatives
Pressure wire (FFR or iFR) to guide the decision	A few extra minutes. With FFR, brief chest tightness or flushing from adenosine. Very rare wire injury to the artery.	Avoids stents you do not need. Catches the blockages that truly need treatment. Backed by large trials (FAME, DEFINE-FLAIR).	Judge by the picture alone (less accurate for borderline blockages). A non-invasive stress test before the cath.
Stent a flow-limiting blockage (score at or below cutoff)	Small procedure risks. A lifetime of at least one blood-thinner pill for a time. Rare re-narrowing.	Relieves flow-limiting blockages. Eases angina. Lowers heart-attack risk for the worst lesions.	Medicine-first trial (for milder symptoms). Bypass surgery (for complex multi-vessel disease).
Leave a non-flow-limiting blockage on medicine (score above cutoff)	Requires sticking with pills and habits. Small chance the blockage progresses and is rechecked later.	Avoids an unneeded stent and its risks. Just as safe as stenting for these blockages in the trials.	Stent anyway (not shown to help these lesions). Repeat the wire later if symptoms change.

Common Misconceptions

Myth	Reality
A blockage that looks bad on the picture always needs a stent.	Not true. The picture can mislead. Many blockages that look severe are not actually limiting blood flow. The wire score tells the difference, and leaving a non-flow-limiting blockage alone is safe.
The pressure wire is a separate, scary procedure.	It is done during the same angiogram you are already having. It adds only a few minutes. Most people feel little or nothing from the wire itself.
iFR is less accurate than FFR because it skips the medicine.	Two large trials (DEFINE-FLAIR and iFR-SWEDEHEART) showed iFR guided stent decisions just as safely as FFR over the first year. The labs pick the test that fits the patient.
If they don't stent my blockage, they are ignoring it.	Leaving a non-flow-limiting blockage alone is a proven treatment, not neglect. You still get statins, blood-pressure control, and follow-up. A stent there would add risk without adding benefit.
A higher wire score is worse.	It is the opposite. A perfect artery scores 1.00. The LOWER the number, the more the blockage is choking off blood flow. Low scores fail; high scores pass.
The wire can fix the blockage.	The wire only measures. It does not treat anything. It helps your doctor decide whether a stent, medicine, or surgery is the right next step.

Possible Complications

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

Where / What	What Can Happen
The artery being tested	Very rarely the wire can scratch or dissect the artery, or trigger a brief spasm. Interventional cardiologists handle this in the same setting. Serious wire injury is uncommon.
Reaction to adenosine (FFR only)	The medicine that opens the small vessels can cause a few seconds of chest tightness, flushing, shortness of breath, or a slow heartbeat. It wears off within seconds. iFR avoids this because it uses no medicine.
The angiogram itself	Because the wire is used during a cath, it shares the angiogram's small risks: bleeding or bruising at the wrist or groin, dye reaction, and rare kidney strain from the contrast dye.
A wrong-sounding number	Rarely the reading can be thrown off by a damped pressure, a kinked wire, or heavy disease in the smallest vessels. The team checks the signal and repeats the reading if it looks off.

Points to Know

If you remember nothing else, remember these key points.

- FFR and iFR measure blood FLOW, not just how a blockage looks. The picture can fool the eye.
- A perfect artery scores 1.00. The lower the number, the worse the blood flow.
- FFR fails at or below 0.80. iFR fails at or below 0.89. A failing score usually means a stent.
- A passing score means the blockage is safe to leave on medicine. That is a real treatment, not neglect.
- The test adds only a few minutes to an angiogram you are already having.
- FFR uses a brief medicine (adenosine). iFR skips it. Both guide the decision just as safely in trials.
- Using the wire leads to fewer unneeded stents and, in FAME, fewer heart attacks and deaths.
- Ask your doctor what your score was and what it means for your plan.

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 or pressure that does not go away, or spreads to the arm, jaw, or back — call 911.
- Sudden severe shortness of breath, fainting, or a cold sweat — call 911.
- Bleeding at the wrist or groin site that soaks through a dressing or swells fast — call 911 or press firmly and call us.
- A growing lump, increasing pain, numbness, or a cold or blue hand or foot below the access site — call us today.
- Fever, chills, or spreading redness at the access site — call us today.
- New or worsening chest pain in the days after your procedure — call us today.
- Questions about your wire score, your stent, or your medicines — call us; we would rather hear from you.

Office: (727) 943-5200

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.

- Cleveland Clinic — Fractional Flow Reserve - Plain-language overview of the FFR pressure-wire test and what the numbers mean.
- Mayo Clinic — Coronary Angiogram - Background on the cath-lab angiogram during which the pressure wire is used.
- American Heart Association — Cardiac Catheterization - AHA patient page on heart catheterization, the setting for FFR and iFR.
- SCAI SecondsCount — Coronary Angiogram and Physiology - Patient education from the Society for Cardiovascular Angiography and Interventions.

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.

- Cleveland Clinic — Fractional Flow Reserve (FFR) *[Clinical]*
  Patient overview of the pressure-wire test that decides whether a blockage needs a stent.
- FAME — FFR vs Angiography for Guiding PCI (NEJM 2009) *[Clinical Trial]*
  Landmark RCT showing FFR-guided PCI improves outcomes and reduces unnecessary stents.
- FAME 2 — FFR-Guided PCI vs Medical Therapy in Stable CAD (NEJM 2012) *[Clinical Trial]*
  Pivotal RCT supporting FFR-guided revascularization of functionally significant lesions.
- DEFINE-FLAIR — iFR vs FFR-Guided PCI (NEJM 2017) *[Clinical Trial]*
  Pivotal RCT establishing iFR (adenosine-free) as non-inferior to FFR for guiding PCI.
- iFR-SWEDEHEART — iFR vs FFR-Guided PCI (NEJM 2017) *[Clinical Trial]*
  Companion pivotal RCT to DEFINE-FLAIR confirming iFR non-inferior to FFR for guiding stent decisions.
- 2021 ACC/AHA/SCAI Coronary Revascularization Guideline *[Guideline]*
  U.S. guideline supporting the use of FFR or iFR to guide treatment of intermediate (borderline) blockages.
- 2024 ESC Guidelines for Chronic Coronary Syndromes *[Guideline]*
  European guideline backing physiology-guided (FFR/iFR) decisions for borderline coronary lesions.
- Mayo Clinic — Coronary Angiogram *[Clinical]*
  Plain-language background on the cath-lab angiogram during which the pressure wire is used.

About This Guide

Rias KS Ali, MD FACC | Board Certified in Interventional Cardiology & Cardiovascular Disease

4740 Mile Stretch Drive, Holiday FL 34690 | Office: (727) 943-5200 | Fax: (727) 943-5201 | RiasAliMD.com

Version: 2026-08-15

Reviewer note: Reviewed: Cleveland Clinic, Mayo Clinic, AHA/ACC, and SCAI patient pages. This guide adds a score number line, a trial-outcomes chart, side-by-side result cards, and an RBA section built on FAME, FAME 2, DEFINE-FLAIR, and iFR-SWEDEHEART.

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.

Take This Guide With You

Scan or visit: https://go.riasalimd.com/ffr-guide

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

Office: (727) 943-5200

4740 Mile Stretch Drive, Holiday FL 34690 | Office: (727) 943-5200 | Fax: (727) 943-5201 | RiasAliMD.com