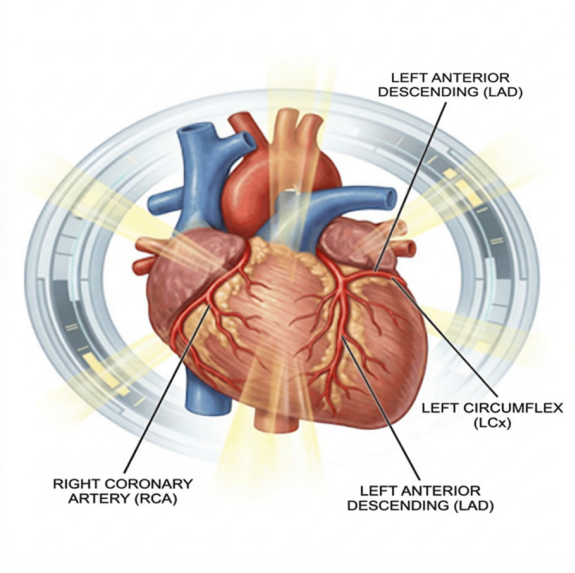
Understanding HFpEF

Heart Failure with Preserved Ejection Fraction

Your Heart's Pump is Strong - Help It Relax.



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

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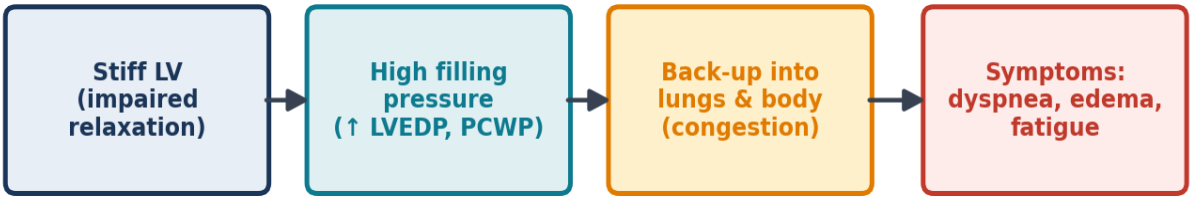
Names & Terms You Will Hear

Term	Meaning
HFpEF	Heart Failure with preserved Ejection Fraction (the medical name we use)
Diastolic heart failure	older term for the same thing
Stiff heart syndrome	lay term - the heart squeezes well but doesn't relax well
Preserved EF	ejection fraction at or above 50%
HFmrEF	mildly reduced EF (41-49%) - similar treatment principles
Congestive heart failure (CHF)	umbrella term that includes HFpEF and HFrEF
NYHA Class I-IV	how we describe symptom severity

What Is HFpEF?

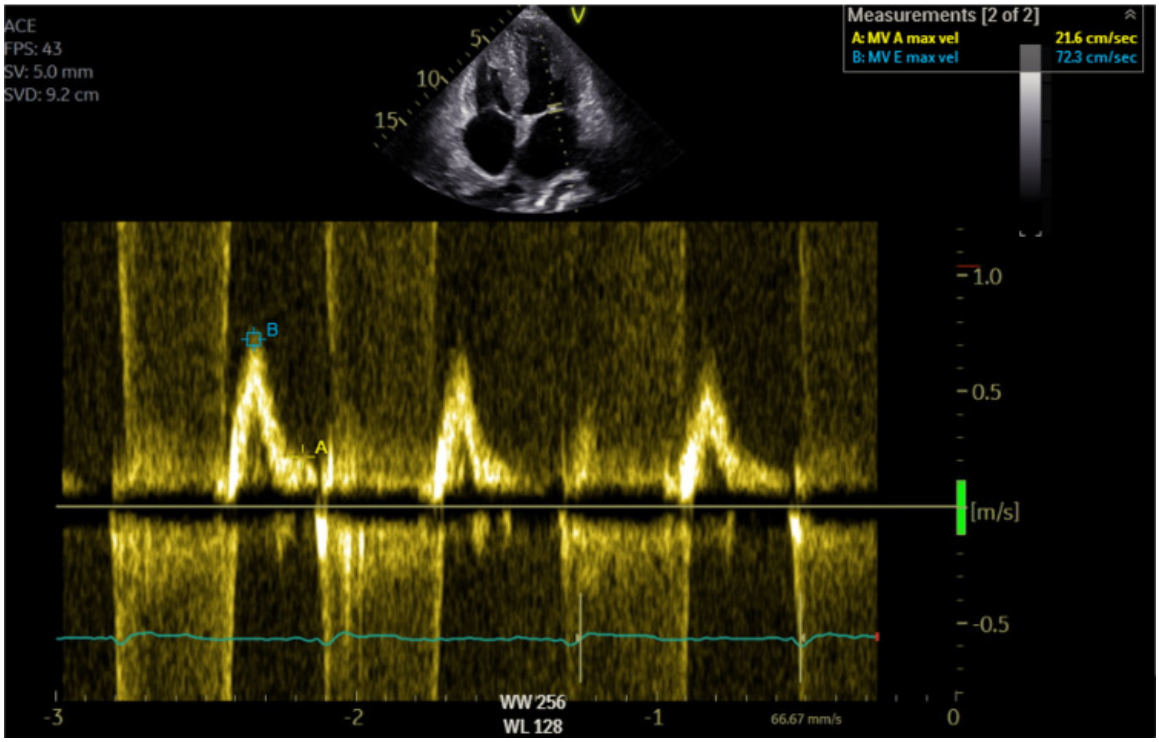
- HFpEF means the heart squeezes normally, but the muscle has become stiff. It cannot relax and fill fully between beats.
- Because the heart cannot fill right, fluid backs up into the lungs and body. This causes shortness of breath, swelling, and fatigue.
- HFpEF makes up about half of all heart failure cases. It is most common in adults over 65.
- Common causes: long-term high blood pressure, obesity, diabetes, atrial fibrillation (AFib), sleep apnea, and kidney disease.
- HFpEF is often missed for years. Symptoms like fatigue or breathlessness can be vague. The echo looks normal because the squeeze is fine.
- The good news: modern medicines — especially SGLT2 inhibitors — clearly improve outcomes. Many patients live well for years.

The HFpEF Cascade — Why a Normal EF Still Causes Heart Failure



Treatment targets every step: SGLT2i + MRA (stiffness), diuretics (pressure/congestion), exercise (symptoms).

The HFpEF cascade. A stiff left ventricle cannot relax fully, so filling pressures rise. That pressure backs up into the lungs and body, producing the symptoms patients feel — even when the ejection fraction looks normal on echo.



A real pulsed-wave Doppler tracing of blood flow into the left ventricle. The tall spike (E) and small bump (A) show a restrictive filling pattern - the stiff heart fills almost entirely in one quick rush, the same abnormal pattern seen on echo in HFpEF. Image: Baptista et al., Cureus 2023 (CC BY 4.0).

A normal ejection fraction does NOT rule out heart failure. EF only measures squeeze. HFpEF is a filling problem — the heart cannot relax and fill, even though it empties fine. If your echo says 'EF 60% — normal' but you still have breathlessness, swelling, or fatigue, ask about HFpEF.

Why It Matters

- Untreated HFpEF leads to repeated hospital stays, less exercise ability, and worse quality of life.
- Over 5 years, survival is similar to other forms of heart failure. HFpEF is NOT a mild disease.
- Good news: SGLT2 inhibitors (empagliflozin, dapagliflozin) cut heart-failure hospital stays and heart-related death by 18–21% (EMPEROR-Preserved, DELIVER trials).
- Treating root causes matters just as much as heart-failure medicines. These include blood pressure, obesity, AFib, and sleep apnea.
- Most patients on full therapy feel better within 4–12 weeks.

NYHA Functional Class — Symptoms by Severity

NYHA Class	Symptoms	What you can typically do
Class I	No symptoms	Walk, climb stairs, and work without limits.
Class II	Mild symptoms with effort	Fine at rest. Brisk walking or stairs causes mild breathlessness.
Class III	Symptoms with light activity	Fine at rest. Short walks or light housework bring on symptoms.
Class IV	Symptoms at rest	Any activity makes breathing worse. Often needs help to leave home.

H2FPEF Score — How We Estimate the Probability of HFpEF

Clinical clue	Points	Why it matters
H — Heavy (BMI above 30)	+2	Obesity raises HFpEF risk
2 — Hypertensive (2 or more BP meds)	+1	High BP burden
F — Atrial Fibrillation (any type)	+3	AFib is a strong marker
P — Pulmonary pressure elevated (echo)	+1	High lung artery pressure
E — Elder (age over 60)	+1	Age-related stiffness
F — Filling pressure high (E/e' > 9)	+1	Echo filling-pressure sign

BNP and NT-proBNP — Interpretation Ranges

Range	BNP (pg/mL)	NT-proBNP (pg/mL)	What it means
HF unlikely	< 100	< 300	Low chance of fluid overload
Unclear	100–400	300–900	Depends on age and kidney function
HF likely	> 400	> 900	High chance — test and treat
Severe / flooded	> 1000	> 2000	Strongly elevated filling pressure

Why Diagnosis Is Hard — and How We Get It Right

- **Symptoms come and go.** Many patients feel fine at rest. Breathlessness or fatigue only appears with effort. So a resting exam often looks normal and the diagnosis gets missed.
- **The resting echo can be misleading.** A condition called 'pseudonormal' (Grade II filling) looks normal on Doppler at rest. The H2FPEF score uses clinical clues — age, weight, blood pressure, AFib, lung pressure, and echo ratio — to flag who needs more testing. A score of 6 or higher means HFpEF is very likely.
- **Stress echo (diastolic exercise echocardiography)** — when the resting echo is unclear, we image the heart during exercise on a bike or treadmill. Up to 50% of HFpEF patients have normal filling pressure at rest. That pressure only rises with effort. This is called exercise-induced diastolic dysfunction (EIDD).
- **Reading the stress test:** POSITIVE when the E/e' ratio is 14 or higher and the tricuspid jet speed is above 3.2 m/s. NORMAL when E/e' is below 10 and TR speed is below 2.8 m/s. If results are in between, the next step is invasive testing.
- **Invasive exercise hemodynamics — the gold standard.** A right-heart catheter measures filling pressure directly during exercise on a bike. Pressure above 25 mmHg with exercise (or above 15 mmHg at rest) confirms HFpEF. This test is used when the stress echo result is unclear.
- **CPET (cardiopulmonary exercise test)** measures peak oxygen use and breathing efficiency. It separates a heart limit from deconditioning, lung disease, or anxiety — and grades how severe the limitation is.
- **The testing ladder:** resting echo → stress echo if symptoms persist → invasive catheter test if stress echo is unclear. Ask for a specialist referral if the diagnosis is still in doubt.

Natural History and Prognosis

- Without treatment, HFpEF moves slowly — but each hospital stay makes the long-term outlook worse. Preventing hospital stays IS the treatment.
- Older data showed 5-year survival like many cancers. With SGLT2 inhibitor therapy, outcomes have improved for the first time.
- What affects prognosis most: age, kidney function, AFib, lung disease, obesity, and how well we control blood pressure, weight, and sleep apnea.
- Most patients live well for many years with proper treatment. The main driver of decline is hospital stays — so the goal is to keep you out of the hospital with well-adjusted medicines.
- Many patients see big quality-of-life gains in the first 3–6 months. They walk farther, sleep flatter, and feel less winded.

Signs of Congestion — What We Look For

- **On chest X-ray:** enlarged upper-lung blood vessels, fine horizontal lines at the lung bases (Kerley B lines), a hazy lung pattern, and fluid around the lungs (pleural effusion — often larger on the right side).
- **On physical exam:** swollen neck veins above the collarbone (seen sitting up), an extra heart sound (S3 gallop), crackling sounds at the lung bases, swollen ankles and shins, and a large or tender liver.
- **Lung ultrasound (bedside):** bright vertical lines called **B-lines** show up in the lungs before the chest X-ray turns positive. This test is the most sensitive early sign of fluid in the lungs and is used more and more in heart clinics.
- **What this means for you:** fluid build-up drives most heart-failure hospital stays. Catching it early — with a daily weight log and watching for new ankle swelling or breathlessness — lets the office raise your diuretic dose by mouth. This can keep you out of the ER.

How to read your H2FPEF score: Add up your points. **Score 0–1:** HFpEF is unlikely (~25%). Keep a symptom diary and look for other causes. **Score 2–5:** Result is unclear. A diastolic stress echo or exercise heart catheterization can confirm the diagnosis. **Score 6–9:** HFpEF is very likely (~95%). Treat it. (Reddy et al., Circulation 2018)

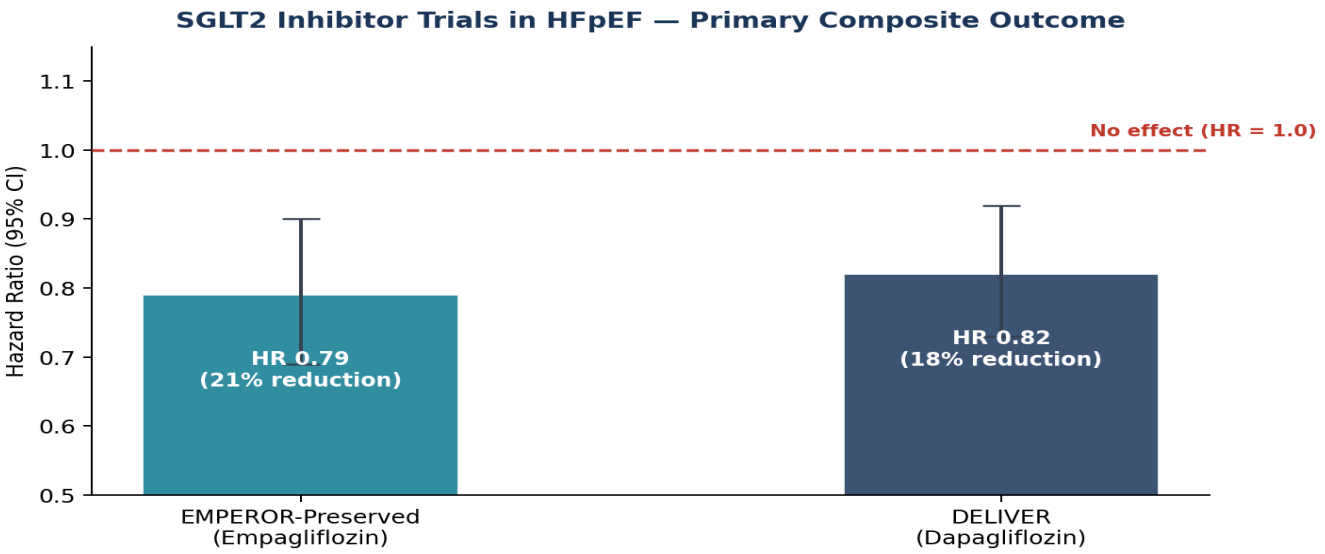
A NORMAL BNP does NOT rule out HFpEF. About 1 in 3 HFpEF patients have a normal BNP. This happens most often in people with **obesity** — fat tissue breaks down BNP. It also happens in African-American patients, who often have lower baseline BNP levels. And it happens when filling pressure only rises during effort, not at rest. If your symptoms persist and your BNP is normal, that is a reason to do **more** testing — not less. A stress echo or exercise catheter test is the next step.

NYHA Class At a Glance — Where Are You?

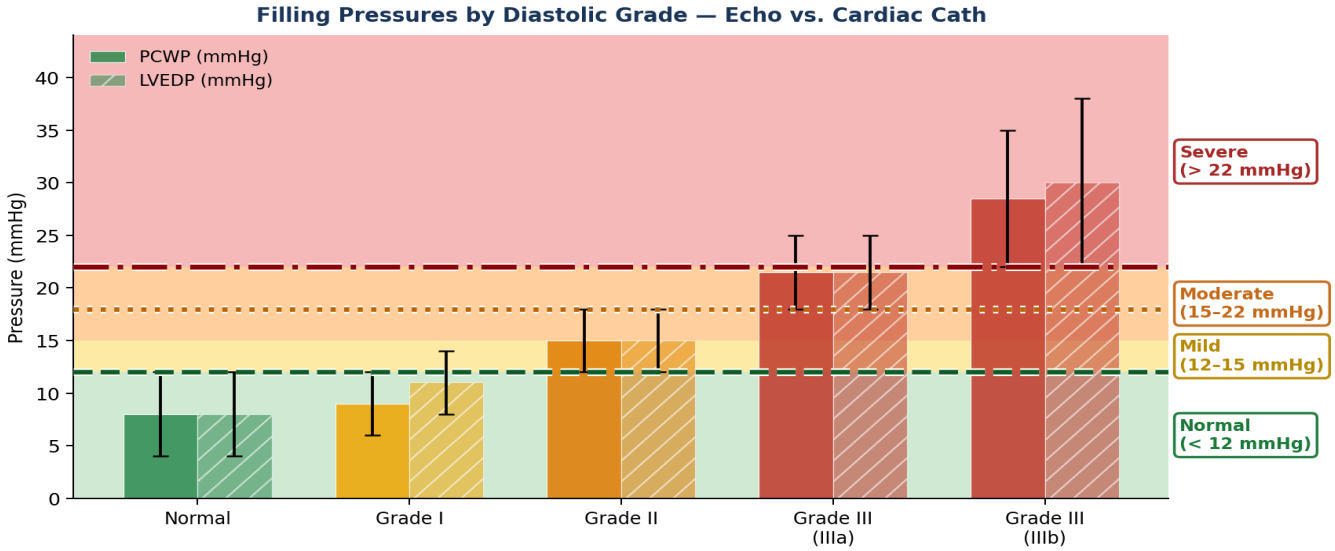
Class I	Class II	Class III	Class IV
• No symptoms	• Mild symptoms with effort	• Symptoms with light activity	• Symptoms at rest
• Normal activity tolerated	• Comfortable at rest	• Comfortable at rest	• Any activity worsens them
• Maintain medicines	• Start/optimize GDMT	• All 4 GDMT pillars	• Advanced HF referral
• Focus on prevention	• Cardiac rehab helps	• Close follow-up needed	• Consider goals of care

Treatment Options

- **SGLT2 inhibitors** (empagliflozin, dapagliflozin) — the cornerstone of modern HFpEF care. They cut hospital stays and heart-related death.
- **Diuretics** (furosemide, torsemide, bumetanide) — remove extra fluid. Dose is adjusted based on daily weights and symptoms.
- **MRAs** (spironolactone, eplerenone, finerenone) — lower the risk of heart events. Finerenone showed strong benefit in the FINEARTS-HF trial.
- **ARNI** (sacubitril/valsartan) — most helpful when the ejection fraction is in the 45–57% range (PARAGON-HF trial).
- **Treat the root causes**: keep blood pressure below 130/80; manage weight; treat AFib with a blood thinner and rate or rhythm control; use CPAP for sleep apnea.
- **Cardiac rehab** — guided aerobic and strength training improves how far and how easily you can move.
- **Why all four medicines together?** Each of the four pillars (SGLT2 inhibitor, MRA, ARNI or ACE inhibitor, diuretic) works on a different pathway. Starting them together — when your blood pressure and kidneys allow — brings benefit faster than adding one at a time.



EMPEROR-Preserved and DELIVER both showed an 18–21% drop in heart-failure hospital stays and heart-related death. These are the first medicines with proven benefit in HFpEF. They work whether or not you have diabetes.



Filling pressures by grade: green = normal (below 12 mmHg); yellow = mild (12–15); orange = moderate (15–22); red = severe (above 22). HFpEF is a disease of high filling pressure. These ranges guide both diagnosis and how hard we treat. (Nagueh et al., ASE/EACVI 2016)

Hemodynamics — What Your Filling Pressures Mean

- **Filling pressure** is the pressure inside the heart's left chambers when they fill between beats. When the heart is stiff (HFpEF), that pressure rises before blood can enter. It backs up into the lungs — causing the breathlessness and fatigue you feel.
- **We measure filling pressure two ways.** The echo uses the E/e' ratio and tricuspid jet speed to estimate pressure (called PCWP). A right-heart catheter measures PCWP directly. Both methods usually agree closely.
- **Normal is below 12 mmHg (Nagueh et al., ASE/EACVI 2016).** Mild elevation is 12–15 mmHg. Moderate is 15–18 mmHg. Severe is 22 mmHg or above.
- **Why these numbers matter:** each 1 mmHg rise in filling pressure links to worse symptoms, more hospital stays, and higher risk of death — regardless of ejection fraction. The goal of HFpEF treatment is: **lower your filling pressure and keep it low.**
- **The chart below** shows typical pressure ranges across the four filling grades. Even Grade I ('mild') can already be in the elevated zone. A normal resting test does NOT rule out HFpEF — up to half of patients only show high pressure during exercise (Borlaug, Nat Rev Cardiol 2020).

Exercise-Induced Filling Problems (EIDD) — Diastolic Stress Testing

- **The 50% problem:** about half of HFpEF patients have normal filling pressures at rest. Their pressures only rise with effort. So a resting echo and a resting BNP can both look fine — even when symptoms are real. Stress testing catches these patients.
- **What happens in a normal heart vs. HFpEF:** with exercise, the echo velocity called e' rises 3–5 cm/s in a healthy heart. In HFpEF, e' barely moves. At the same time, filling speed (E) climbs because pressure in the left atrium is rising. The E/e' ratio goes up — a sign the heart is filling under strain.
- **Who should get it:** patients with unexplained shortness of breath during activity who have a normal resting echo or mild Grade I findings, or those with a high H2FPEF score but normal resting pressure.
- **How it works:** echo at rest → exercise on a lying bike (best for imaging) or treadmill → echo again at peak effort or within 1–2 minutes after. Total time: about 30–45 min. EKG and blood pressure are tracked throughout.
- **POSITIVE:** average E/e' of 14 or more AND tricuspid jet speed above 3.2 m/s. This confirms that filling pressure rose with exercise — HFpEF is diagnosed.
- **NORMAL:** average E/e' below 10 AND TR speed below 2.8 m/s. Look for non-heart causes of breathlessness: deconditioning, lung disease, anemia, or anxiety.
- **UNCLEAR result:** values in between. Next step: invasive exercise test (right-heart catheter with a lying bike). Filling pressure above 25 mmHg with exercise — or above 15 mmHg at rest — confirms HFpEF. This is the gold standard.
- **After a positive result**, treatment is the same as any HFpEF: start an SGLT2 inhibitor, tighten blood pressure control, treat sleep apnea and AFib, and support weight loss.

How to Check Your Weight the Right Way

- **Same time every day** — first thing in the morning, after using the bathroom, before eating or drinking.
- **Same clothes (or nothing)** — clothes weight throws the trend off.
- **Same scale** — household digital scale on a hard floor (not carpet). Calibrate by stepping on twice; use the consistent reading.
- **Write it down** — a paper log or a phone-app entry. Track 7-day rolling change, not just one-day jumps.
- **Bring the log to every appointment.** Your weight trend is one of the most useful pieces of data we have for tuning your diuretic dose.
- If you don't have a scale, ask the office — many practices have loaner scales for HF patients.

Daily Weight Self-Management — Know Your Zone

GREEN — Stable	YELLOW — Caution	RED — Emergency
• Weight stable (± 2 lb)	• Weight up 3 lb in 2 days OR 5 lb in a week	• Weight up > 5 lb in 2 days
• Breathing as usual	• Mild new shortness of breath	• Breathlessness AT REST or can't lie flat
• No new ankle swelling	• Mild new ankle/sock-line swelling	• Chest pain, confusion, or fainting
• ACTION: continue all meds; daily weights; low-salt (< 2 g sodium); keep moving.	• ACTION: **call the office TODAY** — likely need to bump diuretic; recheck weight tomorrow.	• ACTION: **911 or ER NOW** — IV diuretics may be needed.

Risks, Benefits, and Alternatives

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

Option	Risks	Benefits	Alternatives
SGLT2 inhibitor (empagliflozin / dapagliflozin)	Genital yeast infection (treatable, less common than feared). Rare diabetic ketoacidosis. Small, temporary drop in kidney filter rate.	Cuts HF hospital stays and heart-related death by 20% (EMPEROR-Preserved, DELIVER). Also slows kidney decline.	MRA, ARNI, or watchful waiting if not tolerated. Most patients do well.
MRA (spironolactone / finerenone)	Raised potassium (lab checks needed). Breast tenderness with spironolactone — less so with eplerenone or finerenone.	TOPCAT and FINEARTS-HF show fewer heart events. Especially helpful with kidney disease.	ARNI, SGLT2 inhibitor alone, or switch within the drug class.
ARNI (sacubitril/ valsartan)	Low blood pressure. Raised potassium. Rare swelling of the face or throat.	PARAGON-HF showed benefit in patients with ejection fraction 45–57% and in women.	ACE inhibitor or ARB alone, or SGLT2 inhibitor plus MRA.
Diuretic only — no GDMT	Relieves fluid but does not change disease course. Risk of dehydration, low sodium, or kidney strain.	Fast fluid relief. Low cost.	Add SGLT2 inhibitor and MRA — this is the modern minimum standard.

Common Misconceptions

Myth	Reality
HFpEF means I'm dying soon.	Modern treatment can extend life by years. Many patients live well into their 80s and 90s.
My heart squeezes fine, so I don't have heart failure.	Heart failure has two parts: squeeze and relax. HFpEF is the relax problem. Your symptoms are real.
If I lose enough weight, I won't need medicine.	Weight loss helps a lot. But it does not undo the stiffness already there. SGLT2 inhibitors and MRAs still cut heart events.
I should rest as much as possible.	Cardiac rehab and aerobic exercise improve symptoms and survival. Prescribed exercise IS part of treatment.
Salt is fine if I'm not puffy today.	Salt causes the next fluid flare. Keep sodium below 2,000–2,300 mg per day, even when you feel well.
All four heart failure medicines must be added one at a time over many months.	Newer evidence supports starting all four pillars together when blood pressure and kidney function allow. Starting sooner brings benefit sooner.
If my echo looks better, the heart failure is gone.	Better echo findings are good news, but the tendency to stiffen stays. Keep taking your medicines and coming to follow-up.
Diuretics hurt the kidneys.	With careful use and lab checks, diuretics protect the kidney. Fluid build-up harms the kidney too — often more. Adjust the dose. Do not skip it.

Possible Complications

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

Where / What	What Can Happen
Acute decompensation (hospital stay)	Sudden fluid build-up in the lungs needs IV diuretics. Common triggers: too much salt, missed medicines, infection, or AFib.
Atrial fibrillation (AFib)	Up to half of HFpEF patients develop AFib over time. Stroke risk goes up. A blood thinner is usually recommended.
Pulmonary hypertension	Years of HFpEF can raise pressure in the lung arteries. This worsens breathlessness and strains the right side of the heart.
Right-heart failure	A late finding: leg and belly swelling, a congested liver, and poor appetite. Strong diuretics and treating the cause help.
Kidney dysfunction (cardiorenal syndrome)	The heart and kidneys depend on each other. Too much fluid or too little heart output can weaken kidney function.
Low exercise tolerance	A stiff heart cannot fill fast enough during activity. Cardiac rehab and SGLT2 inhibitors directly improve this.

Points to Know

If you remember nothing else, remember these key points.

- Weigh yourself daily. Same time, same scale. Call us if you gain more than 3 lb in 2 days.
- Keep sodium below 2,000 mg per day. Read every food label.
- Take all prescribed medicines: SGLT2 inhibitor, MRA (spironolactone or finerenone), ARNI or ACE inhibitor, and a diuretic.
- Control root causes: blood pressure below 130/80, weight management, CPAP for sleep apnea, blood thinner for AFib.
- Get your flu and pneumonia shots on time. Infections trigger HFpEF flare-ups.
- Say yes to cardiac rehab. It improves both quality of life and survival.
- Know the early warning signs: needing more pillows at night, new swelling, fatigue, or breathlessness with light activity.
- HFpEF is NOT a death sentence. Most patients live well for many years with modern treatment.

Heart failure can become heart success. HFpEF used to have no proven treatments. That changed in 2021. With SGLT2 inhibitors, blood pressure control, weight loss, sleep apnea care, and AFib treatment, many patients now live longer, go to the hospital less, and feel better day to day. The diagnosis is the starting point — not the end.

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.

- Weight gain of more than 3 lb in 2 days, or 5 lb in a week.
- New or worsening shortness of breath at rest or with light activity.
- Need more pillows than usual to breathe at night, or waking gasping for breath.
- Severe leg or belly swelling.
- Lightheadedness or fainting.
- Chest pain or pressure - call 911.
- Stroke symptoms (FACE-ARM-SPEECH-TIME) - call 911.
- Persistent palpitations or racing heart.
- Fever above 100.4F that lasts more than 24 hours.

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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.

- AHA - Heart Failure - Plain-language overview from the AHA.
- Mayo Clinic - Heart Failure - Comprehensive overview with FAQs.
- Cleveland Clinic - HFpEF - Procedure details and recovery information.
- HFSA Patient Hub - Heart Failure Society of America patient-facing materials.

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.

- 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure (Heidenreich et al., JACC 2022) *[Guideline]*
  Primary US guideline framework for HFpEF diagnosis and management.
- Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography (Nagueh et al., JASE 2016; PMID 27037982) *[Guideline]*
  ASE/EACVI consensus algorithm for grading diastolic dysfunction; defines the PCWP / E/e' / TR-velocity thresholds (12, 15, 18 mmHg) used in the Hemodynamics chart and the diastolic-stress-testing criteria.
- Heart Failure with Preserved Ejection Fraction (Borlaug, Nat Rev Cardiol 2020; PMID 32483411) *[Review]*
  Definitive modern HFpEF hemodynamics review covering filling-pressure pathophysiology, EIDD (exercise-unmasked elevated pressures), and invasive exercise hemodynamics as the gold-standard diagnostic.
- A Simple, Evidence-Based Approach to Help Guide Diagnosis of Heart Failure with Preserved Ejection Fraction (H2FPEF Score) (Reddy et al., Circulation 2018; PMID 29792299) *[Clinical Trial]*
  Original derivation of the H2FPEF score (H Heavy / 2 Hypertensive / F AFib / P PulmHTN / E Elder / F Filling pressure). The 0-9 scoring + interpretation table in the guide cites this paper.
- EMPEROR-Preserved Trial - Empagliflozin in HFpEF (Anker et al., NEJM 2021; PMID 34449189) *[Clinical Trial]*
  First positive RCT for SGLT2 inhibitor in HFpEF; reduced CV death and HF hospitalization.
- DELIVER Trial - Dapagliflozin in HFpEF/HFmrEF (Solomon et al., NEJM 2022; PMID 36027575) *[Clinical Trial]*
  Confirmed SGLT2i benefit across full EF spectrum; supports class-effect.
- PARAGON-HF Trial - Sacubitril/Valsartan in HFpEF (Solomon et al., NEJM 2019; PMID 31475794) *[Clinical Trial]*
  ARNI showed signal in HFpEF, especially in women and EF 45-57%; informs current guidelines.
- TOPCAT Trial - Spironolactone in HFpEF (Pitt et al., NEJM 2014; PMID 24716680) *[Clinical Trial]*
  MRA in HFpEF; positive in regional subgroup analysis; supports current Class 2b indication.
- FINEARTS-HF Trial - Finerenone in HFpEF/HFmrEF (Solomon et al., NEJM 2024) *[Clinical Trial]*
  Non-steroidal MRA showed reduced CV events in HFpEF/HFmrEF; emerging therapy.
- American Heart Association - Heart Failure *[Patient Education]*
  Plain-language overview for patients.
- Mayo Clinic - Heart Failure (HFpEF) *[Patient Education]*
  Comprehensive overview with FAQs.

About This Guide

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Reviewer note: Reviewed against AHA Heart.org HF page, Mayo Clinic HF page, and Cleveland Clinic HFpEF page. Ours adds: positive prognosis framing, explicit GDMT pillar list with combined-therapy rationale, and color-coded NYHA staging.

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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