



A Case Based Approach:

Heart Failure with Reduced Ejection Fraction

Jonathan Milton DNP, APNP, ACCNS-AG-CMC

Tina DeGroot PhD, APNP, ACNS-BS, GS-C

November 20th, 2025

Disclosures

- Jonathan Milton DNP, APNP, ACCNS-AG, CCRN-CMC: Part Time Clinical Consultant for IQVIA, representing Johnson & Johnson MedTech – Abiomed
- All relevant financial relationships listed have been mitigated
- We do not intend to discuss any unlabeled/unapproved uses of drugs/devices in the presentation.



Overview

Target Audience:

- Nurses, APRNs, and other Clinicians who have general basic understanding of Heart Failure & Coronary Artery Disease.

By the end of this session, participants will be able to:

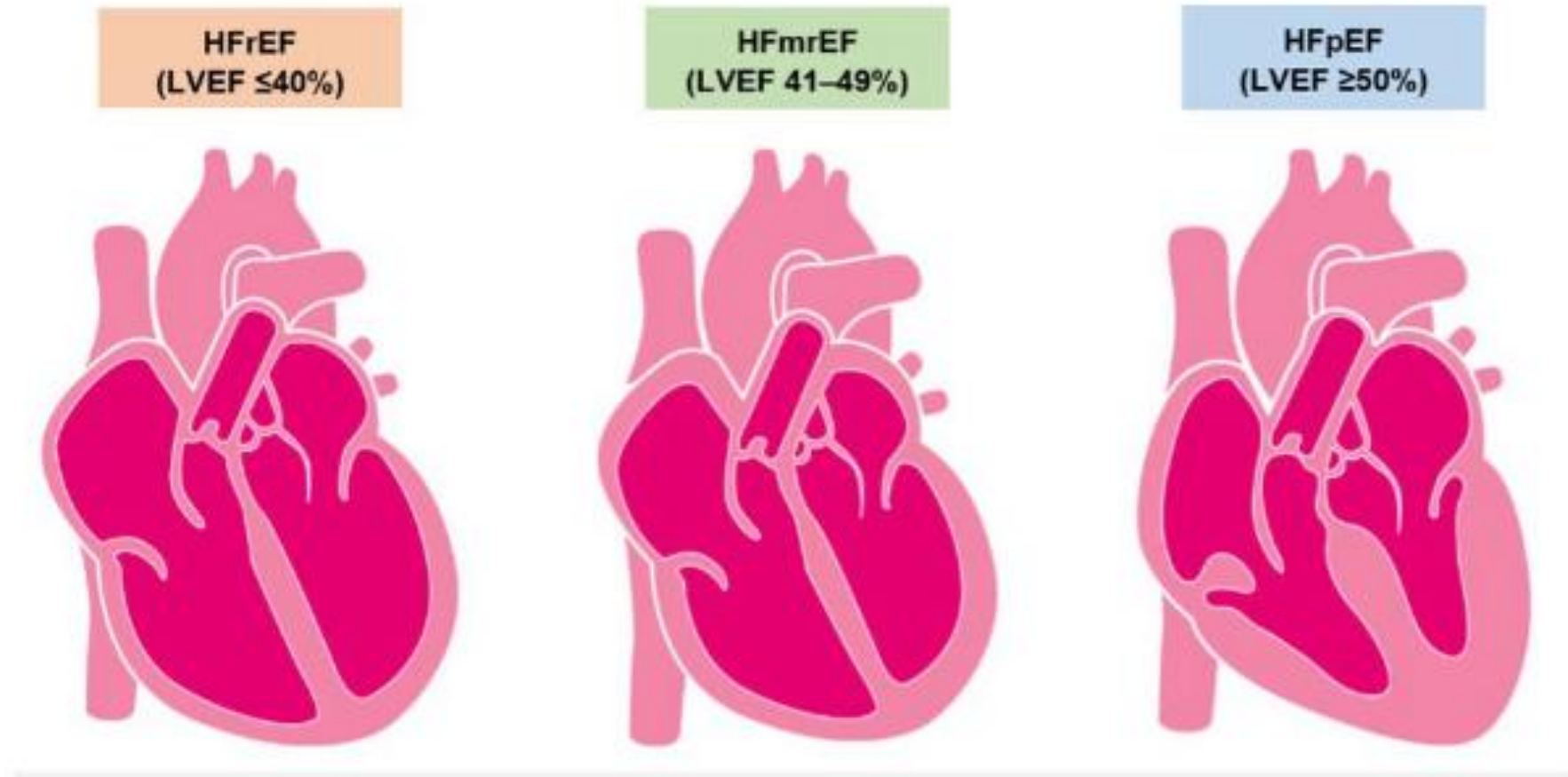
- Recognize early signs and symptoms of ischemic cardiomyopathy.
- Conduct appropriate initial diagnostic evaluation
- Identify red flags and know when to refer to cardiology or advanced HF centers.
- Initiate evidence-based medical management for HFrEF.
- Understand the Nurse/APRN role in ongoing care and education.

Discussion Point

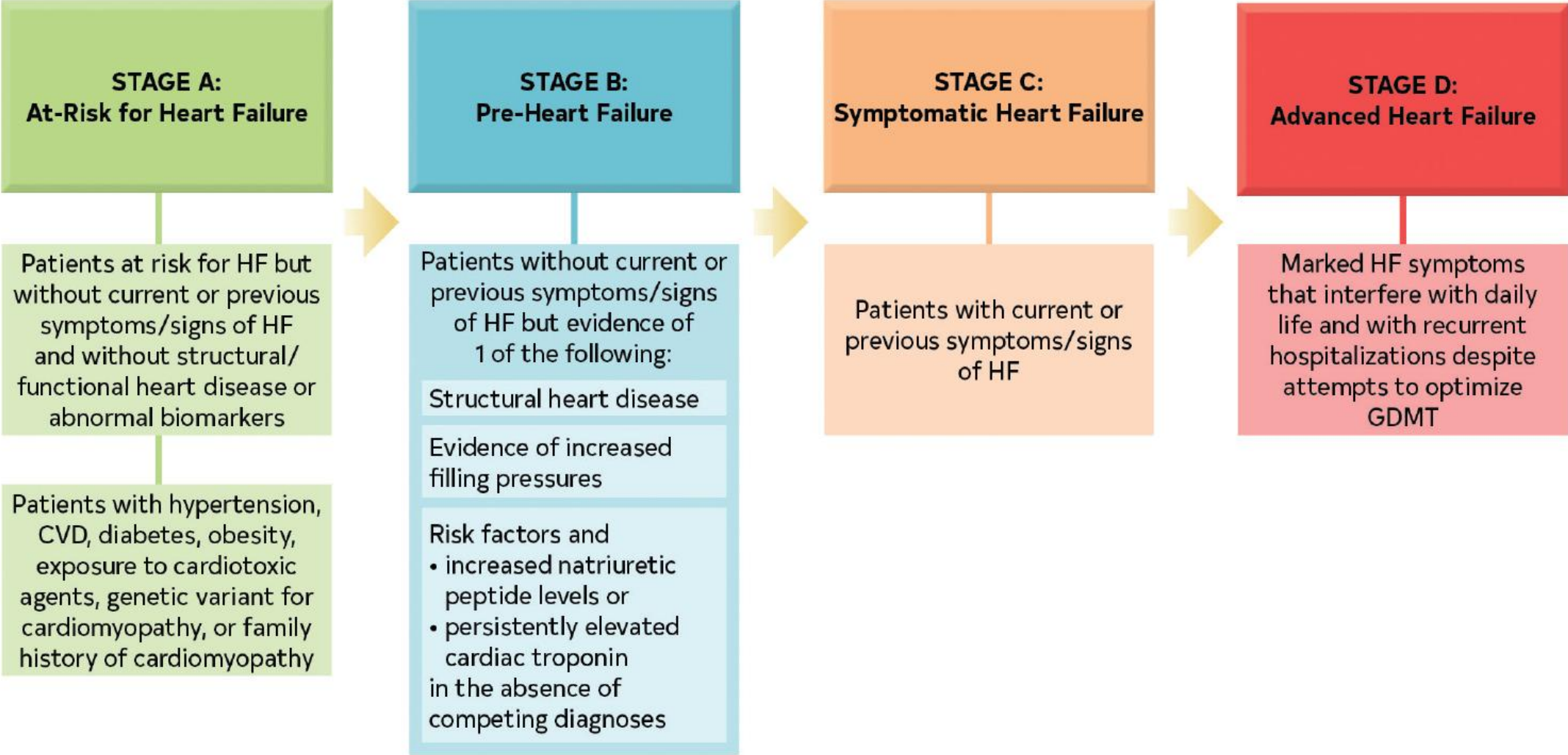
What is the prevalence of HF in Americans over 20 years of age?



Defining Heart Failure



Stages of Heart Failure – AHA/ACC



Classes of Heart Failure

New York Heart Association (NYHA) Functional Classification

Class	Patient Symptoms
I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation or shortness of breath.
II	Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, shortness of breath or chest pain.
III	Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, shortness of breath or chest pain.
IV	Symptoms of heart failure at rest. Any physical activity causes further discomfort.

Ejection Fraction Classification

HF with reduced EF (HFrEF)

- HF with LVEF $\leq 40\%$

HF with mildly reduced EF (HFmrEF)

- LVEF 41%–49%
Evidence of spontaneous or provokable increased LV filling pressures (eg, elevated natriuretic peptide, noninvasive and invasive hemodynamic measurement)

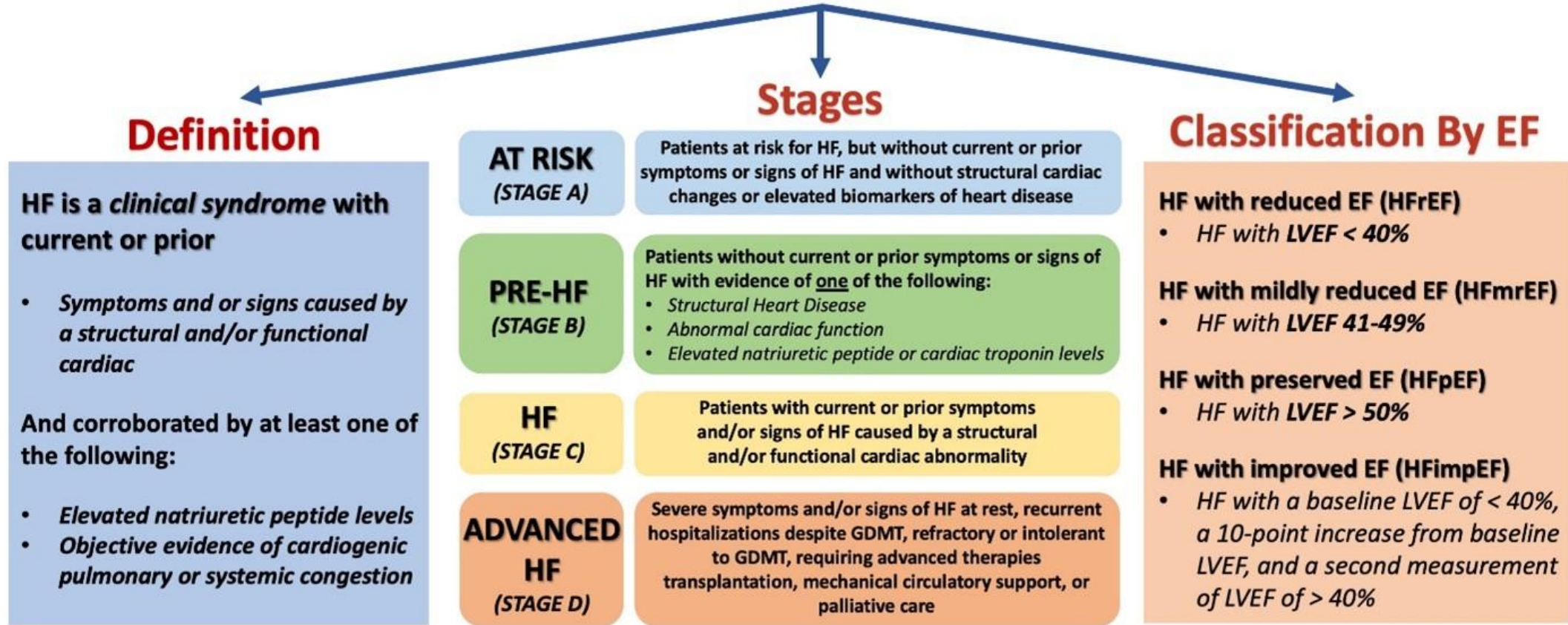
HF with preserved EF (HFpEF)

- LVEF $\geq 50\%$
Evidence of spontaneous or provokable increased LV filling pressures (eg, elevated natriuretic peptide, noninvasive and invasive hemodynamic measurement)

HF with improved EF (HFimpEF)

- Previous LVEF $\leq 40\%$ and a follow-up measurement of LVEF $> 40\%$

Universal Definition and Classification of Heart Failure (HF)



Language matters! The new universal definition offers opportunities for *more precise communication* and description with terms including **persistent HF** instead of “stable HF,” and **HF in remission** rather than “recovered HF.”

Figure 1. Courtesy of Gibson GT, Blumer V, Mentz RJ, Lala A.

Case Study - Initial Visit

Patient: Mrs. PA 66yo F

CC: intermittent minor chest pressure with light gardening. "different than last summer"

HPI 66-year-old Italian woman in for her MC wellness check shares she notices that with gardening this year she has some mild intermittent mid sternal chest pain that does not radiate, lasts < 2 minutes, no n/v or diaphoresis. She sits down and rests and it goes away. Notices slight DOE with inclines when walking, mild ankle edema new from last summer. She attributes it to "getting older".

PMH: HTN, DMT2, HLD

Meds: Lisinopril, Tumeric, Multivitamin, Rosuvastatin, Metformin

Vital Signs: HR 92, BP 142/85, RR 22, SpO₂ 94% on room air, weight 225lbs (up 8 lbs from last year)

Physical Exam: Regular heart rate and rhythm. 2/6 Murmur present. Carotid bruit heard bilaterally. Lung sounds fines rales to bilateral bases, +1 pedal edema bilaterally

CLINICAL DECISION MAKING DISCUSSION



Discussion Point

What about her HPI or Physical Assessment is jumping out at you?



Case Study - Initial Visit

Patient: Mrs. PA 66yo F

CC: intermittent minor chest pressure with light gardening. "different than last summer"

HPI 66-year-old Italian woman in for her MC wellness check shares she notices that with gardening this year she has some mild intermittent **mid sternal chest pain** that does not radiate, lasts < 2 minutes, no n/v or diaphoresis. She sits down and rests and it goes away. Notices **slight DOE** with inclines when walking, **mild ankle edema** new from last summer. She attributes it to "getting older".

Meds: Lisinopril, Tumeric, Multivitamin, Rosuvastatin

Vital Signs: HR 92, BP **142/85**, RR 22, SpO₂ 94% on room air, weight 225lbs (up 8 lbs from last year)

Physical Exam: Regular heart rate and rhythm. **2/6 Murmur present. Carotid bruit heard bilaterally.** Lung sounds **finer rales** to bilateral bases, +1 pedal **edema** bilaterally

CLINICAL DECISION MAKING DISCUSSION



Discussion Point

Top 3 Differential Diagnoses?



Case Study Progression - Still Initial Visit

1. Differentiate Between Stable Angina vs. Heart Failure

RATIONALE:

- Mrs. PA reports **intermittent chest discomfort with exertion**, relieved by rest and described as “**different than last summer**”, without radiation or systemic symptoms — suggesting **possible anginal symptoms**.
- However, she also reports **dyspnea on exertion**, new **ankle edema**, weight gain, **basilar rales**, and **elevated heart rate** — all pointing toward **early or mild congestive heart failure**, possibly **HF**, especially given her age, gender, hypertension, and preserved systolic BP.

DECISION POINT:

- Order an **ECG** and consider **stress testing or referral for cardiology** to assess for **ischemic heart disease**.
- Concurrently, order a **BNP/pro-BNP** and an **echocardiogram** to evaluate for **diastolic dysfunction or volume overload**, consistent with **HF**.

Case Study Progression - Still Initial Visit

2. Rule Out Aortic Stenosis vs. Vascular Disease (e.g., PAD or Carotid Artery Disease)

RATIONALE:

- The **2/6 murmur** and **bilateral carotid bruits** raise concern for **aortic stenosis** or **atherosclerotic vascular disease**. In older adults, exertional chest pain and dyspnea could result from **valvular heart disease**.
- Given her **history of dyslipidemia** (on rosuvastatin) and **new-onset edema**, she may also have **underlying peripheral or carotid arterial disease** contributing to exertional symptoms.

DECISION POINT:

- Consider **echocardiography** to evaluate the nature of the murmur (aortic stenosis vs. mitral regurgitation).
- Consider **carotid Doppler studies** to assess for **stenosis** given bilateral bruits.
- Assess ankle-brachial index (**ABI**) if peripheral arterial disease is suspected due to her activity-related symptoms and risk profile.

Red Flags!

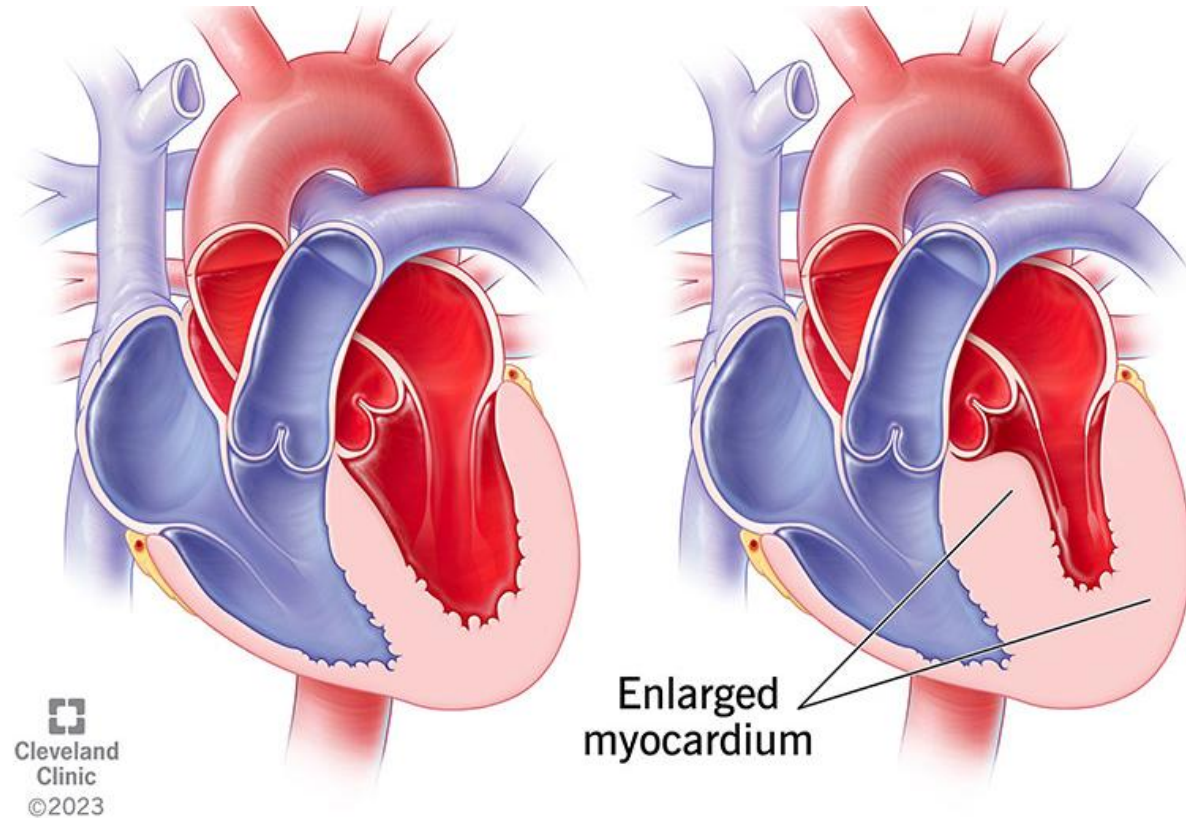
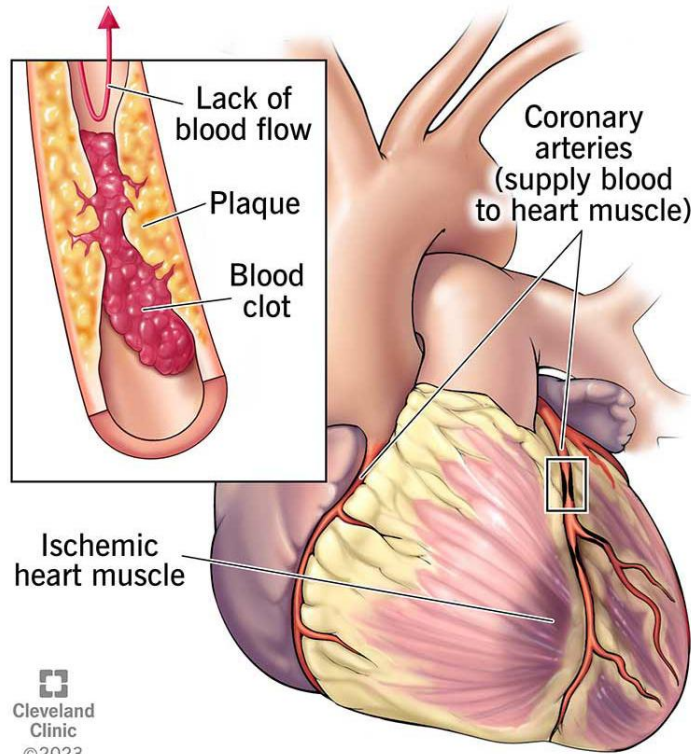
**When to
consider
initial
referral**



How do we decide what stress test to order?



Ischemic Cardiomyopathy



Case Study progression – 2 week follow-up

Patient: Mrs. PA 66yo F

Clinical Story: At initial visit Prescriber ordered **Diuretic** to address congestion and HTN with nurse visit follow-up for symptom monitoring. Mrs. PA returns for 2-week provider follow-up

Imaging:

- **Echo** new reduced EF 40%, mild AS
- **Stress Test** – positive mild ST changes
- **Doppler (70% R ICA)** → Vascular referral
- **ABI (0.85)** - Mild PAD

Vital Signs: HR 75, BP 140/85, RR 18, SpO₂ 94% on room air, Weight 220lbs

Physical Exam: Clear lung sounds, Trace bilateral LE edema



Case Study Progression

 Summary of Key Clinical Implications:

Condition	Test Support	Next Steps
HFrEF	Echo (EF 40%), BNP 820	Initiate GDMT (e.g. beta-blocker, SGLT2i); monitor symptoms; cardiac rehab
Stable ischemic heart disease	Stress test (mild ST changes), ECG (LVH)	Cardiology referral; nuclear stress or coronary CTA
Mild aortic stenosis	Echo (AVA 1.5 cm ² , gradient 18 mmHg)	Monitor annually; manage BP, avoid volume overload
Significant carotid stenosis	Doppler (70% R ICA)	Referred to vascular surgery for intervention
Mild PAD	ABI (0.85)	Encourage walking program, optimize statin/aspirin therapy



Guideline Directed Medical Therapy – Why does it matter?

Heart failure admissions = high risk for mortality and readmission

GDMT reduces mortality by >60% when fully implemented

- 62% (HR: 0.38; 95% CI: 0.3–0.47) compared to conventional therapy with just ACEi/ARB plus beta-blocker.

Initiating GDMT during hospitalization matters—it's a key opportunity that improves adherence, target dosing, and prevents long-term undertreatment.

Rapid Up-Titration improves all dimensions of QoL in patients with HF and improves prognosis

Guideline Directed Medical Therapy Across Heart Failure Stages

Use this tool to reference guideline directed medical therapy (GDMT) across the four ACC/AHA stages of Heart Failure (HF) as outlined in the 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. See the guideline for specific patient population criteria.

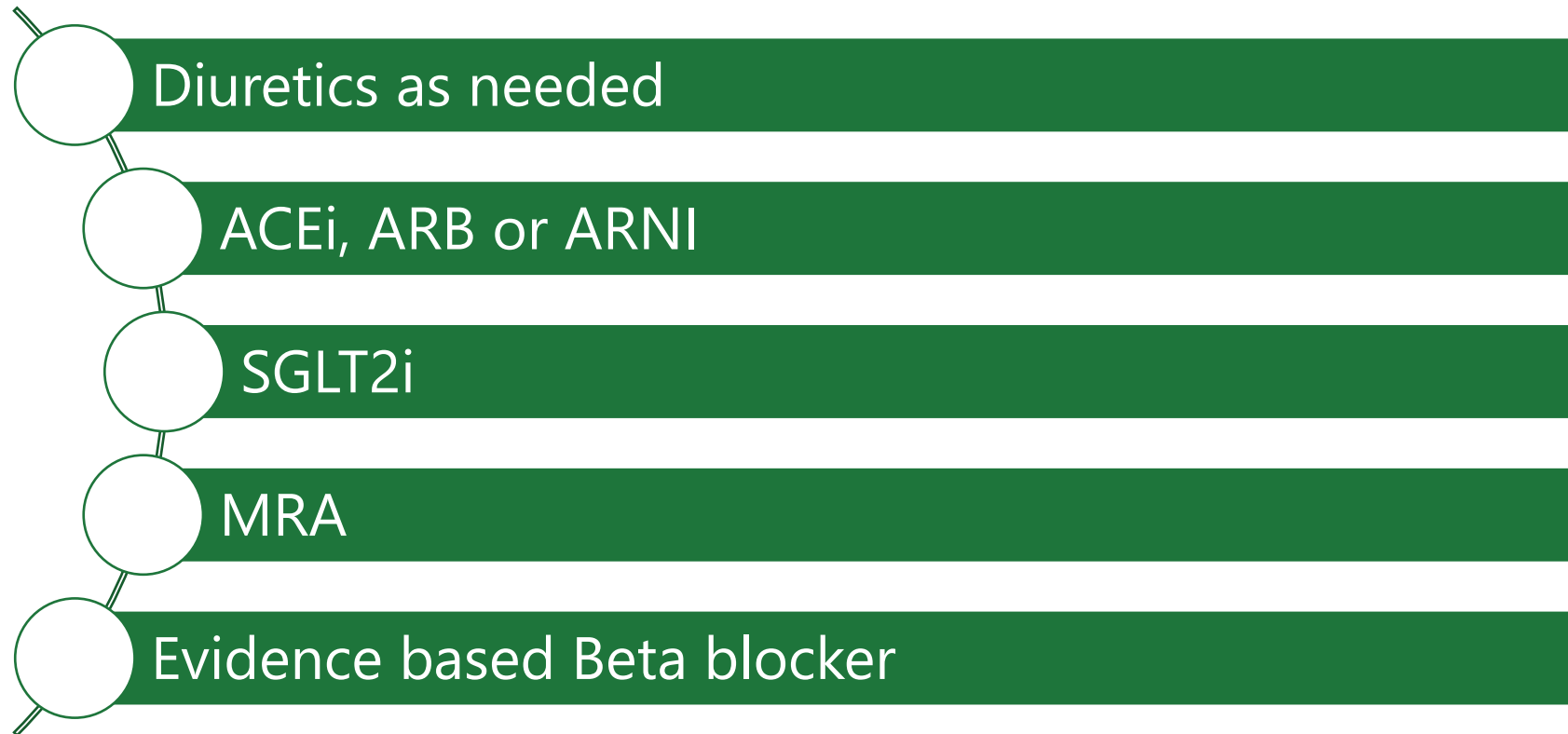
GDMT of major medication classes	Stage A	Stage B	Stage C & D		
	At-Risk for Heart Failure	Pre-Heart Failure	Stage C: Symptomatic Heart Failure & Stage D: Advanced Heart Failure		
			HFrEF LVEF ≤40%	HFmrEF LVEF 41-49%	HFpEF LVEF ≥50%
	SGLT2i in pts with DM (1)	SGLT2i in pts with DM (1)	ARNi in NYHA II-III; ACEi or ARB in NYHA II-IV (1)	Diuretics, as needed (1)	Diuretics, as needed (1)
		ACEi (1)	Beta blocker (1)	SGLT2i (2a)	SGLT2i (2a)
		ARB if ACEi intolerant (1)	MRA (1)	ACEi, ARB, ARNi (2b)	ARNi (2b)
		Beta blocker (1)	SGLT2i (1)	MRA (2b)	MRA (2b)
			Diuretics, as needed (1)	Beta blocker (2b)	ARB (2b)
			Hydral-nitrates for NYHA III-IV, in African American pts (1)		
Additional Medical Therapies once GDMT optimized	Optimal control of BP (1)	Optimal control of BP (1)	Ivabradine (2a)		
	Optimal management of CVD (1)	Optimal management of CVD (1)	Vericiguat (2b)		
			Digoxin (2b)		
			PUFA (2b)		
			Potassium binders (2b)		

1 (strong) 2a (Moderate) 2b (Weak)

Guidelines

GDMT in HFrEF

Guideline Directed Medical Therapy (GDMT) Heart Failure with Reduced Ejection Fraction (HFrEF)



ACEi / ARB

Key takeaways with initiation / titration



Consider for patients where ARNI not possible



1-2 weeks, assess tolerability and titration to max dose per guidelines



Monitor BP, electrolytes, renal function

ARNI (Angiotensin Receptor Neprilysin Inhibitor)

Key takeaways with initiation / titration



If previously on ACEi, ensure 36 hours off before initiation



1-2 weeks, assess tolerability and titration to max dose per guidelines



Monitor BP, electrolytes, renal function

SGLT2i

Key takeaways with initiation / titration



Prescribe dapagliflozin, empagliflozin or sotagliflozin



Assess GFR $\geq 25\text{mL}/\text{min}/1.73\text{m}^2$ (dapa or sota)



Monitor patients who may be at increased risk for UTI

Mineralocorticoid Antagonists (MRAs)

Key takeaways with initiation / titration



Increase dose at least every 2 weeks until max tolerated or target dose



Monitor BP, electrolytes (potassium), renal function

Beta Blocker

Key takeaways with initiation / titration



Use of Evidence-Based Beta Blocker



Increase dose every 2 weeks until max tolerated or target dose



Monitor HR, BP, and signs of congestion after initiation / during titration

Guideline Directed Medical Therapy Across Heart Failure Stages

Use this tool to reference guideline directed medical therapy (GDMT) across the four ACC/AHA stages of Heart Failure (HF) as outlined in the 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. See the guideline for specific patient population criteria.

GDMT of major medication classes	Stage A	Stage B	Stage C & D		
	At-Risk for Heart Failure	Pre-Heart Failure	Stage C: Symptomatic Heart Failure & Stage D: Advanced Heart Failure		
			HFrEF LVEF ≤40%	HFmrEF LVEF 41-49%	HFpEF LVEF ≥50%
	SGLT2i in pts with DM (1)	SGLT2i in pts with DM (1)	ARNI in NYHA II-III; ACEi or ARB in NYHA II-IV (1)	Diuretics, as needed (1)	Diuretics, as needed (1)
		ACEi (1)	Beta blocker (1)	SGLT2i (2a)	SGLT2i (2a)
		ARB if ACEi intolerant (1)	MRA (1)	ACEi, ARB, ARNi (2b)	ARNi (2b)
		Beta blocker (1)	SGLT2i (1)	MRA (2b)	MRA (2b)
			Diuretics, as needed (1)	Beta blocker (2b)	ARB (2b)
			Hydral-nitrates for NYHA III-IV, in African American pts (1)		

Case Study progression - Over a few weeks & 3 – 6Mo F/U

Clinical Story:

Patient was initiated on an evidence-based **beta blocker**, followed by an **MRA**, and then **SGLT2i** therapy and Transitioned from ACE to **ARNI**. GDMT complete *within 8 weeks... or faster!*

Cardiac Stress testing **abnormal** referred for Cardiac Catheterization → x2 DES to RCA

3-6mo f/u Imaging: Echo LVEF now 50%

Medications	
✓ Spironolactone (MRA)	-Metformin
✓ Metoprolol (Evidence-Based BB)	-Aspirin
✓ Empagliflozin (SGLT2i)	-Ticagrelor
✓ Sacubitril/Valsartan (ARNI)	-Rosuvastatin



Reasons for Nonadherence (WHO)

Patient	<ul style="list-style-type: none">▪ Perceived lack of effect▪ Poor health literacy▪ Disabilities without affording appropriate accommodations▪ Mental health disorders (depression, anxiety)▪ Social isolation▪ Cognitive impairment (eg, dementia)
Medical condition	<ul style="list-style-type: none">▪ High HF regimen complexity▪ Impact of comorbidities (eg, depression)▪ Polypharmacy due to multiple comorbidities
Therapy	<ul style="list-style-type: none">▪ Frequency of dosing (eg, hydralazine, nitrates)▪ Polypharmacy▪ Side effects
Socioeconomic	<ul style="list-style-type: none">▪ Difficult access to pharmacy▪ Lack of social support▪ Homelessness
Health system	<ul style="list-style-type: none">▪ Poor communication▪ Silos of care▪ No automatic refills▪ Difficulty navigating patient assistance programs▪ Unaffordable cost of care, including medication costs

Reference:

2024 ACC Expert Consensus Decision Pathway for Treatment of Heart Failure With Reduced Ejection Fraction: A Report of the American College of Cardiology Solution Set Oversight Committee

Nurse / APRN Role in Chronic Management



Monitoring



Titration of Meds



Patient Self-Management Support



Care Coordination

Key Takeaways

01

Ischemic cardiomyopathy can present subtly in primary care.

02

Early recognition and GDMT initiation can improve outcomes.

03

Nurses and APRNs play a vital role in diagnosis, education, and care continuity.

04

Multidisciplinary collaboration is key—from clinic to cardiology to cardiac rehab.

Questions & Answers

Resources

- Arnett, D. K., Blumenthal, R. S., Albert, M. A., Buroker, A. B., Goldberger, Z. D., Hahn, E. J., Himmelfarb, C. D., Khera, A., Lloyd-Jones, D., McEvoy, J. W., Michos, E. D., Miedema, M. D., Muñoz, D., Smith, S. C., Jr, Virani, S. S., Williams, K. A., Sr, Yeboah, J., & Ziaeian, B. (2019). 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*, *140*(11), e596–e646. <https://doi.org/10.1161/CIR.0000000000000678>
- Bozkurt, B., Coats, A. J. S., Tsutsui, H., Abdelhamid, M., Adamopoulos, S., Agler, D. A., ... & Zile, M. R. (2021). Universal definition and classification of heart failure: A report of the Heart Failure Society of America, Heart Failure Association of the European Society of Cardiology, Japanese Heart Failure Society, and Writing Committee. *Journal of Cardiac Failure*, *27*(4), 387–413. <https://doi.org/10.1016/j.cardfail.2021.01.022>
- Heidenreich, P. A., Bozkurt, B., Aguilar, D., Allen, L. A., Byun, J. J., Colvin, M. M., ... Yancy, C. W. (2022). 2022 AHA/ACC/HFSA guideline for the management of heart failure: Executive summary: A report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Journal of the American College of Cardiology*, *79*(17), 1757–1780. <https://doi.org/10.1016/j.jacc.2021.12.011>
- Loke, I., Antoniou, S., Boramakot, R., Walters, D., & Fuat, A. (2024). Demystifying heart failure with a preserved ejection fraction: what you need to know. *The British journal of general practice : the journal of the Royal College of General Practitioners*, *74*(740), 103–105. <https://doi.org/10.3399/bjgp24X736396>
- López Ferreruela, I., Obón Azuara, B., Malo Fumanal, S., Rabanaque Hernández, M. J., & Aguilar-Palacio, I. (2024). Gender inequalities in secondary prevention of cardiovascular disease: a scoping review. *International journal for equity in health*, *23*(1), 146. <https://doi.org/10.1186/s12939-024-02230-3>

Resources Cont'

- Maddox, T. M., Januzzi, J. L., Jr, Allen, L. A., Breathett, K., Brouse, S., Butler, J., Davis, L. L., Fonarow, G. C., Ibrahim, N. E., Lindenfeld, J., Masoudi, F. A., Motiwala, S. R., Oliveros, E., Walsh, M. N., Wasserman, A., Yancy, C. W., & Youmans, Q. R. (2024). 2024 ACC Expert Consensus Decision Pathway for Treatment of Heart Failure With Reduced Ejection Fraction: A Report of the American College of Cardiology Solution Set Oversight Committee. *Journal of the American College of Cardiology*, 83(15), 1444–1488. <https://doi.org/10.1016/j.jacc.2023.12.024>
- Mebazaa, A., Davison, B., Chioncel, O., Cohen-Solal, A., Diaz, R., Filippatos, G., Metra, M., Ponikowski, P., Sliwa, K., Voors, A. A., Edwards, C., Novosadova, M., Takagi, K., Damasceno, A., Saidu, H., Gayat, E., Pang, P. S., Celutkiene, J., & Cotter, G. (2022). Safety, tolerability and efficacy of up-titration of guideline-directed medical therapies for acute heart failure (STRONG-HF): a multinational, open-label, randomised, trial. *Lancet (London, England)*, 400(10367), 1938–1952. [https://doi.org/10.1016/S0140-6736\(22\)02076-1](https://doi.org/10.1016/S0140-6736(22)02076-1)
- Sekulic, M., Zacharias, M., & Medalion, B. (2019). Ischemic cardiomyopathy and heart failure: Consideration for fibromuscular dysplasia with intimal fibroplasia of coronary arteries. *Circulation: Heart Failure*, 12(6). <https://doi.org/10.1161/CIRCHEARTFAILURE.119.006006>
- Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Alonso, A., Beaton, A. Z., Bittencourt, M. S., ... & American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2022). Heart disease and stroke statistics—2022 update: a report from the American Heart Association. *Circulation*, 145(8), e153-e639.
- WRITING COMMITTEE MEMBERS (2025). HF STATS 2025: Heart Failure Epidemiology and Outcomes Statistics An Updated 2025 Report from the Heart Failure Society of America. *Journal of cardiac failure*, S1071-9164(25)00326-4. Advance online publication. <https://doi.org/10.1016/j.cardfail.2025.07.007>