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Diagnosing HFpEF: What Every Non-Cardiologist Needs to Know

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HFpEF: Incidence, Prevalence, and Outcomes

- Overall, incidence rates for HF in general are decreasing but not specifically for HFpEF[a]
- Prevalence of HFpEF approaches 1% to 2% of the overall population[b]
- HFpEF represents approximately 50% of all HF[a,c]
- Prevalence is increased in[a]
  - Patients > 70 years of age
  - Women
  - Obese patients
- Outcomes are variable, depending on severity and comorbidity, but approach those of HFrEF[d,e]

a. Savarese G, et al. *Cardiac Fail Rev.* 2017;3:7-11; b. Oktay AA, et al. *Curr Heart Fail Rep.* 2013;10:1-17;
c. Lam CSP, et al. *Eur J Heart Fail.* 2011;13:18-28; d. Borlaug BA, *Nat Rev Cardiol.* 2014;11:505-515;
e. Bello NA, et al. *Circ Heart Fail.* 2014;7:590-595.

HFpEF: Difficulty of Diagnosis

- Symptoms are similar to HFrEF, such as breathlessness, fatigue, and edema
- Symptoms are often revealed with exercise
- Many patients do not have a prior history of MI or CAD

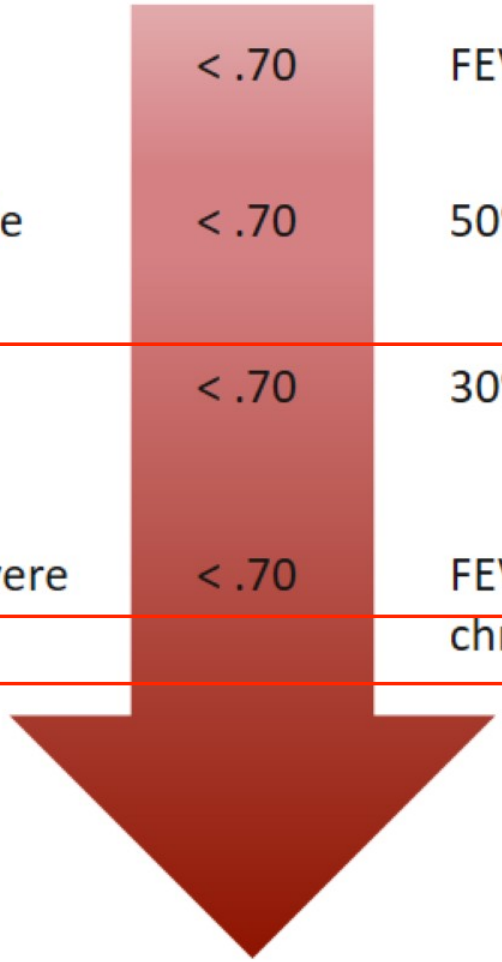
Dyspnea: COPD or Heart Failure?

- Both conditions present with dyspnea
- They are both chronic conditions
- Both conditions present in the elderly
- Incidence
  - 20% of COPD patients will have HF[a]
  - 20% of HF patients will have COPD[b]
- Similarities of symptoms at night
  - PND is associated with HF
  - Bronchoconstriction associated with COPD is also worse at night

a. McCullough PA, et al. *Acad Emerg Med.* 2003;10:198-204.
b. De Miguel Diez J, et al. *Int J COPD*. 2013;8:305-312.

GOLD Classification of COPD Severity

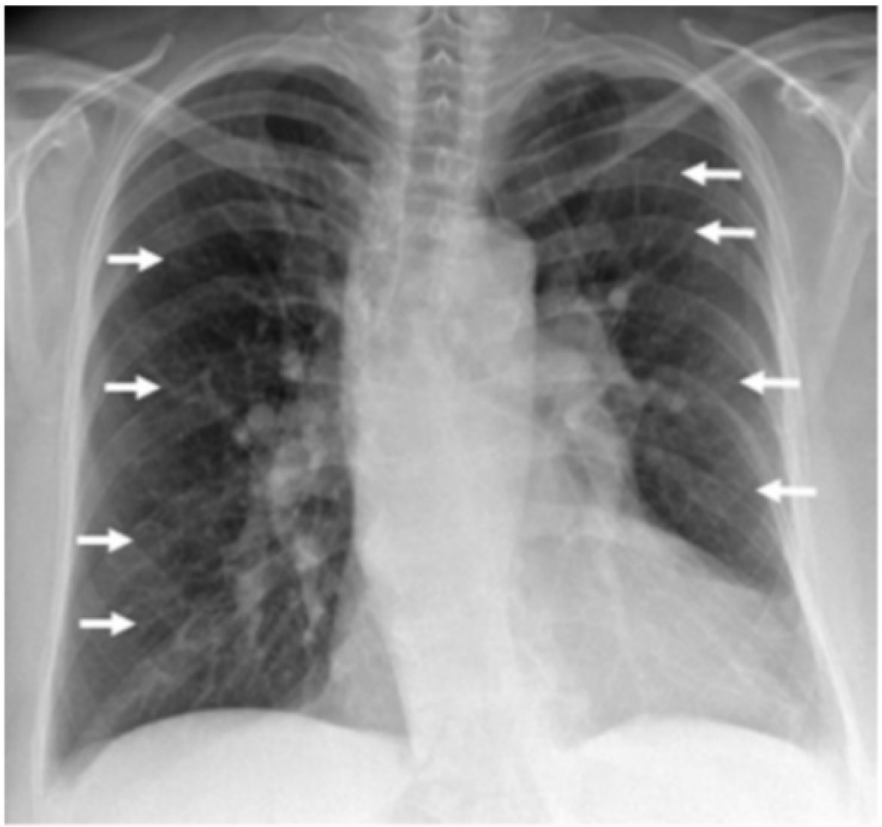
	FEV_1/FVC	FEV_1 predicted
I. Mild	< .70	$FEV_1 \geq 80\%$
II. Moderate	< .70	$50\% \leq FEV_1 < 80\%$
III. Severe	< .70	$30\% \leq FEV_1 < 50\%$
IV. Very severe	< .70	$FEV_1 < 30\%$ or $FEV_1 < 50\%$ plus chronic respiratory failure



Hawkins NM, et al. *Eur J Heart Fail*. 2009;11:130-139.

Evaluation of the Patient With Dyspnea: The Respiratory Specialist's Perspective

- Obtain a good clinical history -- COPD exacerbations are often associated with infection
- Assess for presence of other lung diseases
- With peripheral pruning, which may be seen on CXR in lung disease, upper lobe congestion may be difficult to see
- CT may be useful to assess for emphysema, bronchiectasis, COPD and interstitial lung disease
- Assess for presence of risk factors, such as smoking, which may be present in lung disease and ischemic heart disease, which may lead to HF



Peripheral Pruning

Hawkins NM, et al. *Eur J Heart Fail*. 2009;11:130-139.

Breathlessness -- Are Lung Disease and HF Coexisting?

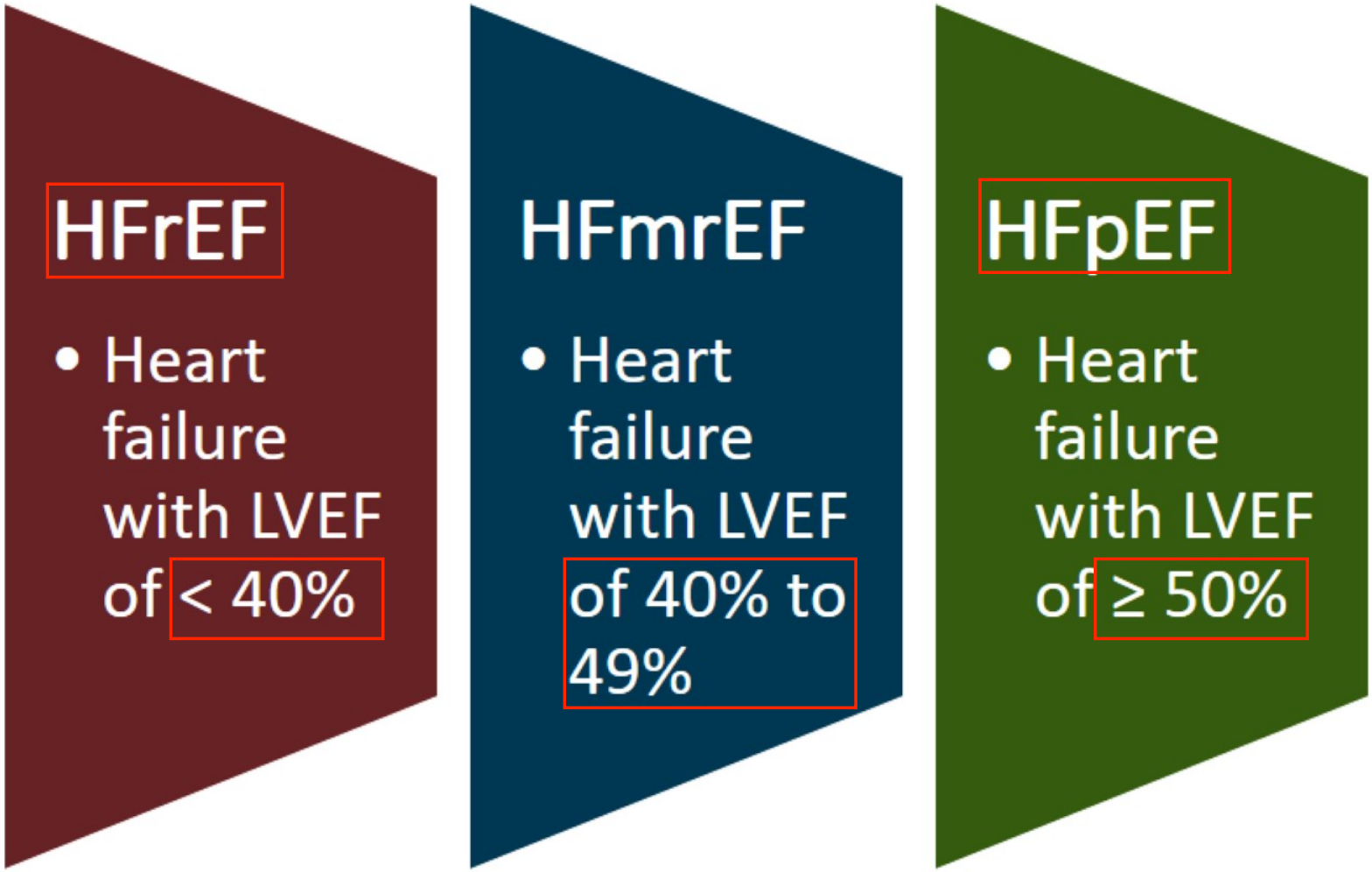
- It is important to exclude respiratory disease when breathlessness is present
- With breathlessness, respiratory disease and HF may coexist
- In screening studies of patients with COPD in primary care, 25% of the patients that GPs think have COPD actually do not have it; they have HF
- COPD is a common comorbidity in patients with HF, but it is important to distinguish between the 2

Fisk M, et al. *Brit J Gen Pract*. 2019;69:e1-e7.

Diagnosing HFpEF: The Cardiologist's Perspective

- Symptoms are similar between HFrEF and HFpEF
- Symptoms will often present during exercise
- Patients often initially present to the GP with dyspnea on exertion
- Assessment of LVEF is also important

ESC 2016 Guidelines: Classifications of HF



Ponikowski P, et al. *Eur Heart J*. 2016;18:891-975.

Comparison of Natriuretic Peptide Testing

According to the NICE guidelines[a]

- If NT pro-BNP results are very high, with levels > 2000 ng/L (or 236 pmol/L) -- patients should be urgently referred for HF specialist assessment and TTE within 2 weeks
- If NT-proBNP levels are 400 to 2000 ng/L, refer to HF specialist within 6 weeks
- When NT-proBNP levels are < 400 ng/L, alternative causes for heart failure related symptoms should be considered

2016 ESC HF Guidelines[b]:

If NT-proBNP is < 125 pg/mL or BNP is < 35 pg/mL, HF is ruled out

ACC/AHA/HFSA 2017 Guideline for HF Update[c]:

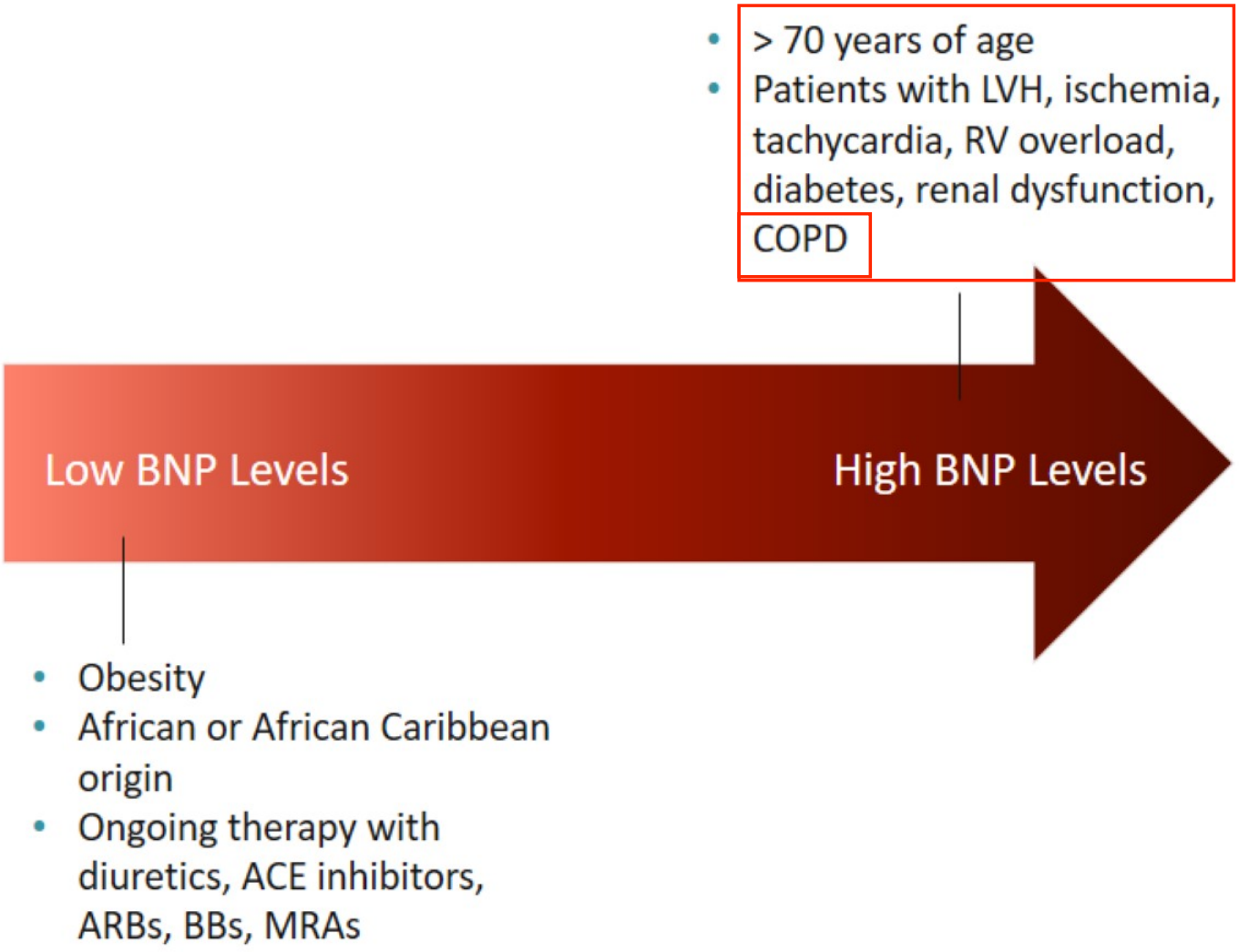
Supports BNP testing

With the > 400 pg/ml cutoff, you will miss 1 in 5 HF cases[d]

With the > 125 pg/mL cutoff, you will cover most of HF cases; but adds 20% more echocardiography tests[d]

a. NICE Guidelines. Chronic heart failure in adults. 2018; b. Ponikowski P, et la. *Eur J Heart Fail.* 2016;18:891-975; c. Yancy CW, et al. *J Am Coll Cardiol.* 2017;0:776-803; d. Taylor CJ, et al. *Br J Gen Pract*. 2017;67;e94-e102.

BNP Levels: Too Low? Too High?



NICE Guidelines. Chronic heart failure in adults. 2018.

Echocardiography Criteria for HFpEF

- Increased E/e' ratio, which is a noninvasive surrogate or estimate of filling pressures
- Increased LA volume
- Evidence of concentric remodeling or PH

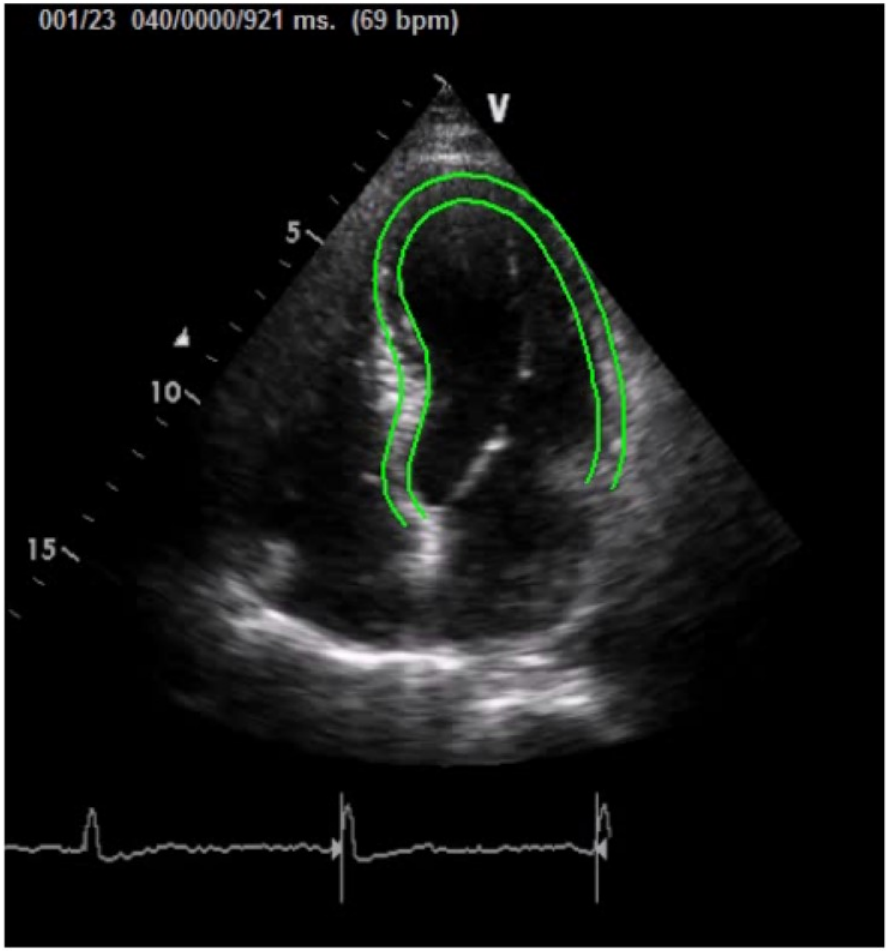


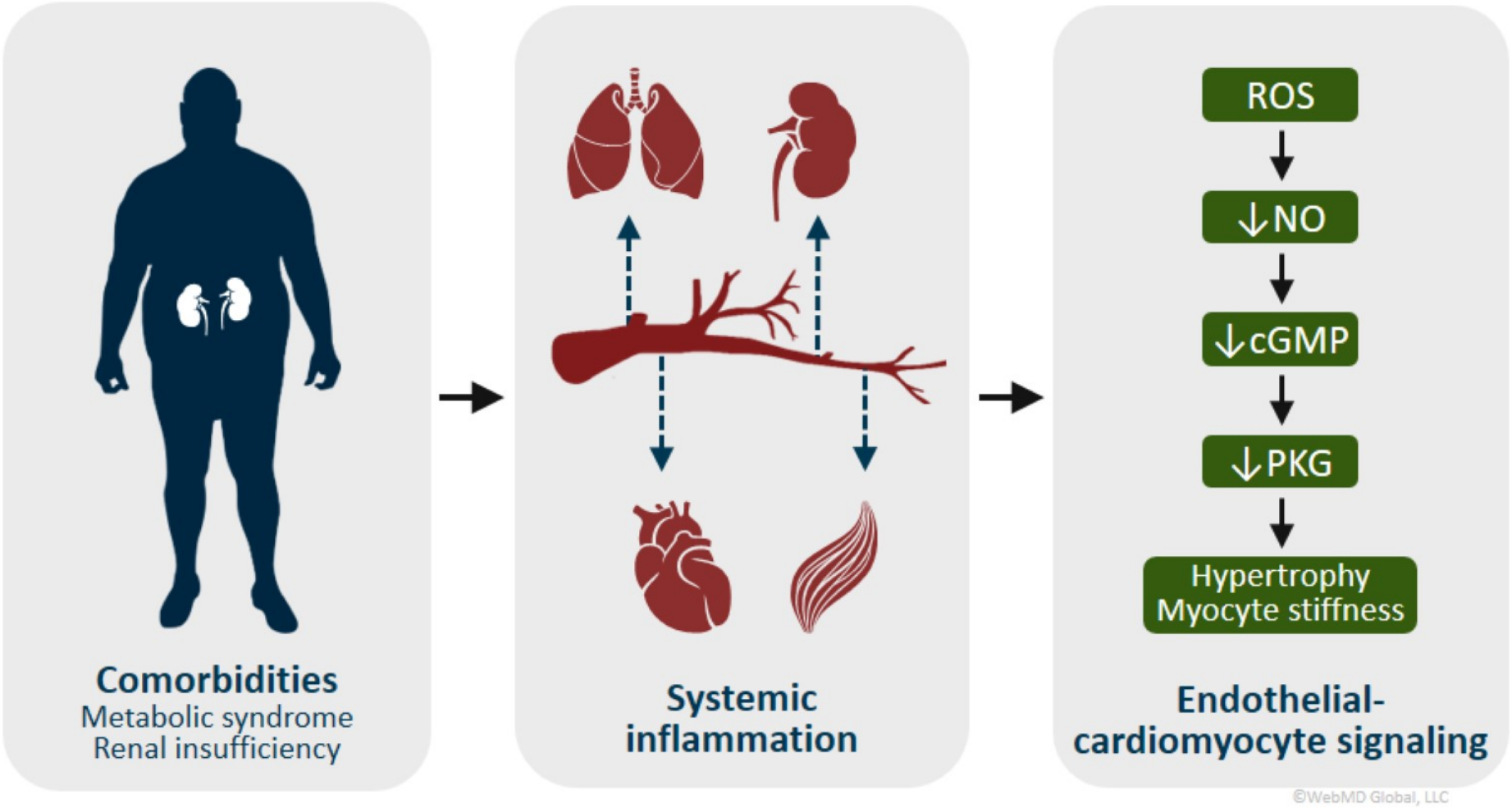
Image is courtesy of Scott Solomon, MD.

Shah A, et al. *Circ Heart Fail*. 2014;7:740-751.

HFrEF or HFpEF: Why Is It Important to Make the Distinction?

- Prognosis may be slightly different
- Specific therapies are available for HFrEF, which may decrease the disease progression
- With recognition of HFpEF, you can at least treat the comorbidities, which will hopefully impact outcomes

Is HFpEF an Inflammatory Disease?

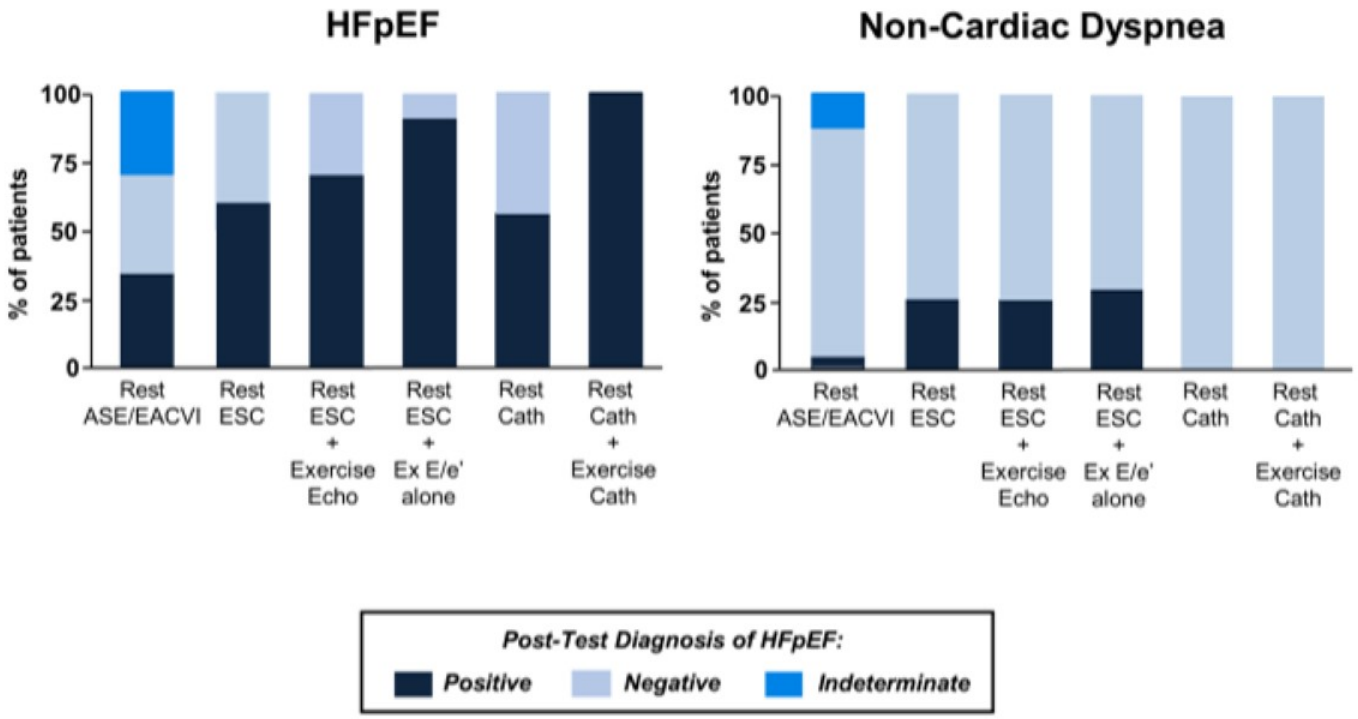


Shah S, et al. *Circulation.* 2016;1:73-90.

How Can We Improve the Process of Diagnosing HFpEF?

- Increased knowledge is needed; not all HF is HFrEF!
- Improved delivery of care is needed with an increased emphasis on recognition and management of comorbidities
- Ongoing assessment of disease management and disease trajectories is important

Use of Stress Echocardiography and Right Heart Catheterization to Diagnose HFpEF



Obokata M, et al. *Circulation.* 2017;135:825-838.

Assessment of BNP in AF and HFpEF Trials

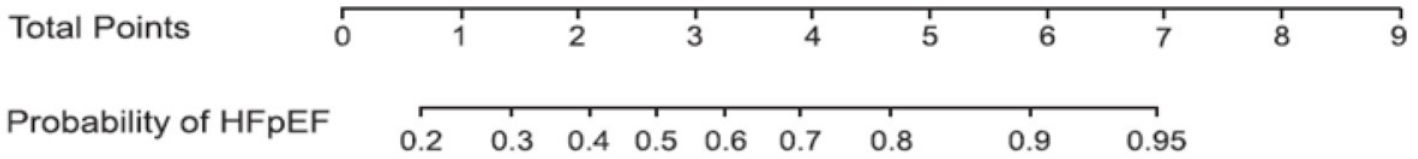
- Values for BNP cutoffs are usually higher in HFpEF trials that include patients with AF
- Goal is to ensure that the level set is high enough to identify the HFpEF patient in the presence of AF
- In several trials, the value for BNP has been doubled for patients with AF

Kotecha D, et al. *J Am Coll Cardiol.* 2016;68:2217-2228.

H2FPEF Scoring

H_2	**H**eavy **H**ypertensive	BMI > 30 kg/m^2 ≥ 2 antihypertensive medications • 2 points for BMI; 1 point for antihypertensive agents
F	Atrial **F**ibrillation	Paroxysmal or persistent • 3 point
P	**P**ulmonary Hypertension	Doppler echocardiographic estimated pulmonary artery systolic pressure > 35 mm Hg • 1 point
E	**E**lder	Age > 60 years • 1 point
F	**F**illing Pressure	Doppler echocardiographic E/e' > 9 • 1 point

H_2FPEF score **Sum (0 to 9)**



Reddy YNV, et al. *Circulation*. 2018;138:861-870.

Importance of the Multidisciplinary Team

- Currently, specialists' care seems to be rather "compartmentalized"
- Physicians need to be trained to manage multi-morbidities
- It's important that the MDT include cardiac and respiratory expertise, in addition to nursing, diabetes experts, and other specialists
- The primary care MD is also an important part of the team

Management of Vague Symptoms and Unclear Diagnosis

- Despite basic workup and assessment for anemia and baseline spirometry, the etiology of breathlessness may not be clear
- Therapies for both cardiac and respiratory causes, such as diuretics and bronchodilators, may be tried but are not ideal
- In respiratory disease, an FEV_1/FVC ratio < 70% may be present, supporting COPD, but if a restrictive defect also exists, pulmonary congestion may be present, interfering with pulmonary function tests[a]
- If a trial of therapies is attempted, such as diuretics or bronchodilators, lung function and persistence of symptoms should be monitored

a. Hawkins NM, et al. *Eur J Heart Fail.* 2009;11:130-139

When Should the GP Refer to a Specialist?

- If diagnosis is unclear, refer to the appropriate specialist for additional testing
- If diagnosis is unclear and symptoms are not improving, do not delay referral
- Once the appropriate diagnosis is made, refer the patient to the specialist if the patient is not improving or symptoms are worsening
- Diseases can mimic each other, and treatment for one disease may make another disease state worse
- Many patients present initially to the emergency department with worsening of dyspnea with exercise
- Prevention is also key, so management of risk factors and early referral, if needed, is essential!

Conclusions: Take-Home Messages

- With dyspnea, think of other diseases -- apart from cardiac disease
- Early diagnosis of HF is important to ensure prompt start of treatment
- HFpEF is common, and a higher index of suspicion is warranted
- With HFpEF, it is important to
  - Root out the causes of symptoms early; these may be multiple
  - Don't just focus on diagnosing one problem; explore all potential issues

Abbreviations

ACC = American College of Cardiology
ACE = angiotensin-converting enzyme
AF = atrial fibrillation
AHA = American Heart Association
ARB = angiotensin receptor blocker
ASE = American Society of Echocardiography
BB = beta blocker
BMI = body mass index
BNP = B-type natriuretic peptide
CAD = coronary artery disease
cGMP = cyclic guanosine monophosphate
COPD = chronic obstructive pulmonary disease
CXR = chest x-ray
E = peak velocity of early diastolic mitral annular motion as determined by pulsed-wave Doppler
e' = peak velocity of early diastolic transmitral flow
EACVI = European Association of Cardiovascular Imaging
ESC = European Society of Cardiology
FEV = forced expiratory volume

Abbreviations (cont)

FVC = forced vital capacity
GP = general practitioner
H2FPEF = (1) a body mass index (BMI) > 30 kg/m2 (H); (2) use of ≥ 2 antihypertensive medications (H); (3) the presence of atrial fibrillation (F); (4) pulmonary hypertension defined as pulmonary artery systolic pressure > 35 mm Hg (P); (5) elderly with an age > 60 years (E); and (6) elevated filling pressures evident from E/e' > 9 (F)
HF = heart failure
HFmrEF = heart failure with midrange ejection fraction
HFpEF = heart failure with preserved ejection fraction
HFrEF = heart failure with reduced ejection fraction
HFSA = Heart Failure Society of America
LA = left atrium, left atrial
LVEF = left ventricular ejection fraction
LVH = left ventricular hypertrophy
MD = medical doctor
MDT = multidisciplinary team
MI = myocardial infarction
MRA = mineralocorticoid receptor antagonist
NICE = National Institute for Health and Care Excellence

Abbreviations (cont)

NO = nitric oxide
NT-proBNP = N-terminal pro B-type natriuretic peptide
PCP = primary care physician
PH = pulmonary hypertension
PKG = protein kinase G
PND = paroxysmal nocturnal dyspnea
ROS = reactive oxygen species
RV = right ventricular
TTE = transthoracic echocardiogram