

When Medications are Not Enough

Identifying & Referring Patients for Advanced Heart Failure Therapies

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Disclosures

I am a paid speaker for Abbott...

...one time I put a case of bottled water on the bottom of my grocery cart and forgot about it and only realized I didn't pay for it when I got to my car....



Outline & Objectives

1. Discuss the epidemiology of heart failure
 2. Define advanced heart failure and its incidence
 3. Review what advanced heart failure therapies are available
 4. Discuss the evaluation for advanced heart failure therapies
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1. Describe identifying features of advanced heart failure and advanced heart failure therapies
2. Explain who should be referred for evaluation of advanced heart failure therapies



“You miss 100% of the
Advanced Heart Failure that
you don't recognize- Adam Burdorf”
-Scott Lundgren



Epidemiology of Heart Failure

-There is an estimated 6.2⁽²⁾ million Americans with heart failure and it is estimated that by 2030, there will be **>8 million⁽¹⁾**.

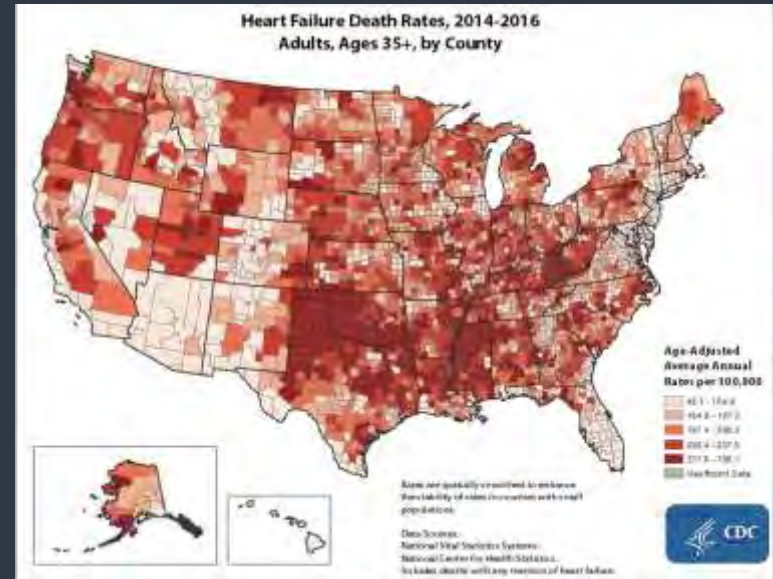
-Each year, **960,000** new cases of heart failure are diagnosed⁽¹⁾

-In 2017, there were 1.2 million HF hospitalizations in the United States⁽¹⁾

-By age **45** has a **1 in 5** lifetime risk of developing heart failure

-In 2018, heart failure was mentioned on 379,800 death certificates (13.4%)⁽²⁾

-Of incident hospitalized HF events, **53% had HF with reduced ejection fraction and 47% had preserved ejection fraction**

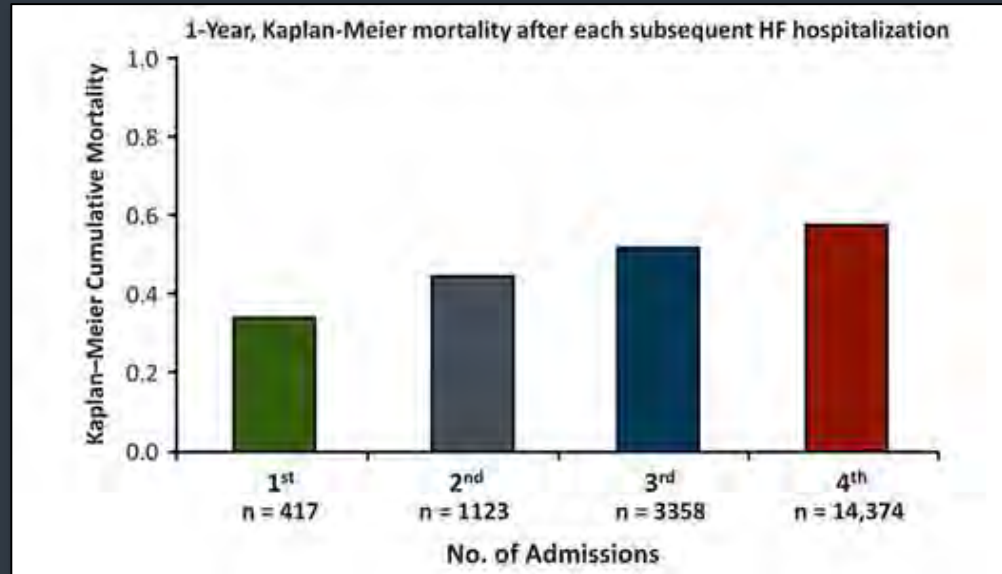


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Epidemiology of Heart Failure

- Frequent readmissions result in increasing mortality
 - Each admission results in a 10% increase in mortality



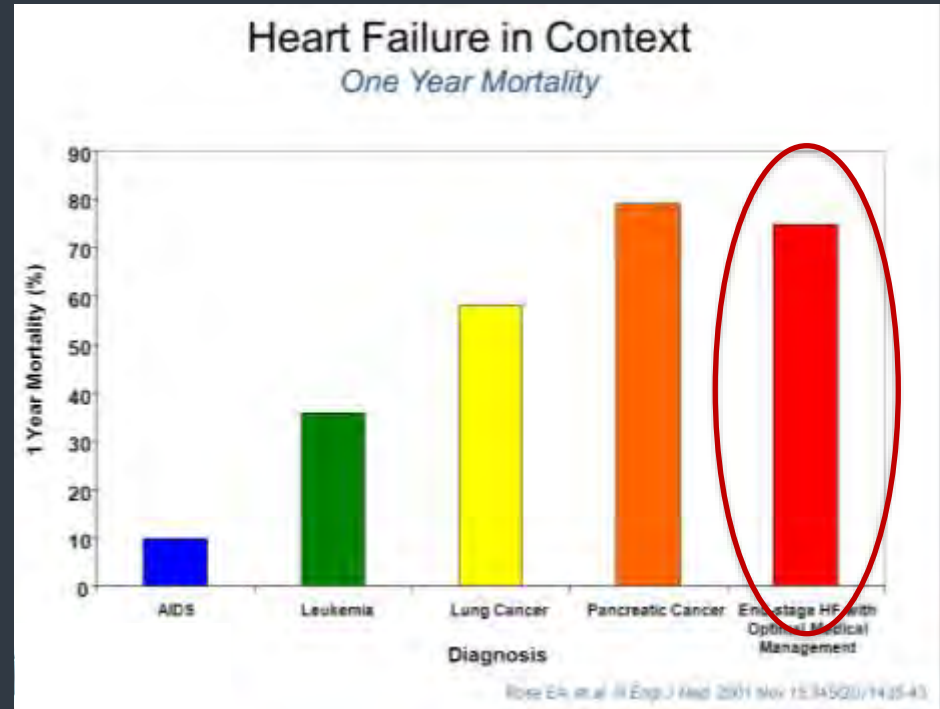
Setoguchi S, et al. Am Heart J. 2007



Epidemiology of Heart Failure

-Survival decreases in regard to ACC/AHA stages of heart failure

- 97% in stage A
- 96% in stage B
- 75% in stage C
- 20% in stage D

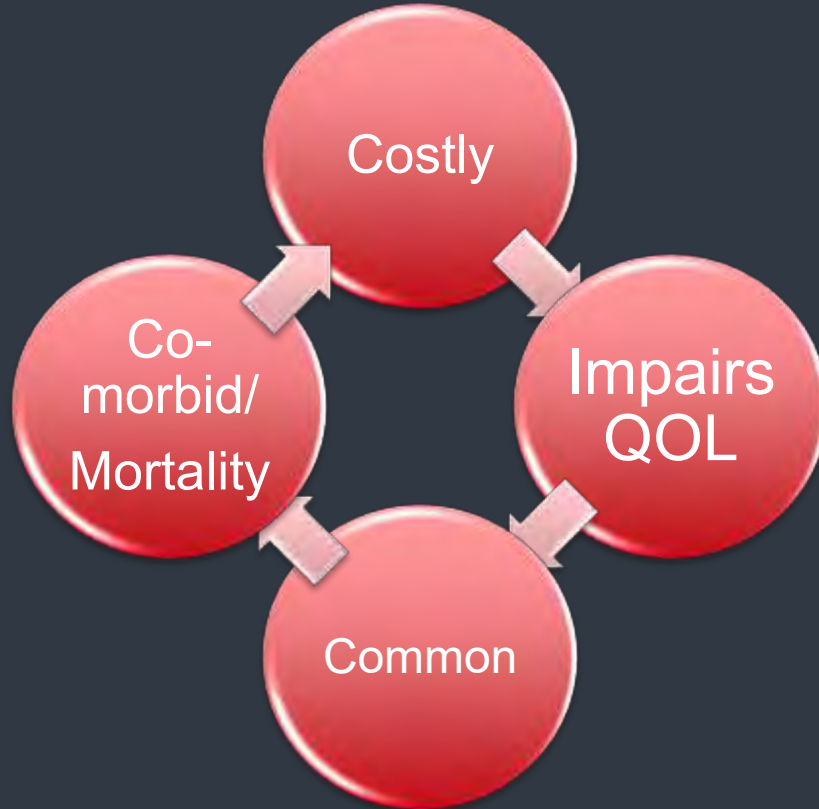


Epidemiology of Heart Failure

- Annual cost of heart failure is \$43.6 billion as of 2020⁽¹⁾
- Expected to grow to \$69.8 billion by the year 2030⁽²⁾
 - Majority of cost is due to hospitalization (70%)⁽¹⁾
- 1.1 million ED visits annually ⁽³⁾
- Median cost for CHF hospitalizations was \$13,418
- Average 30-day post-discharge cost following a HF admission was \$6283⁽⁴⁾



Epidemiology of Heart Failure



Our role is to:

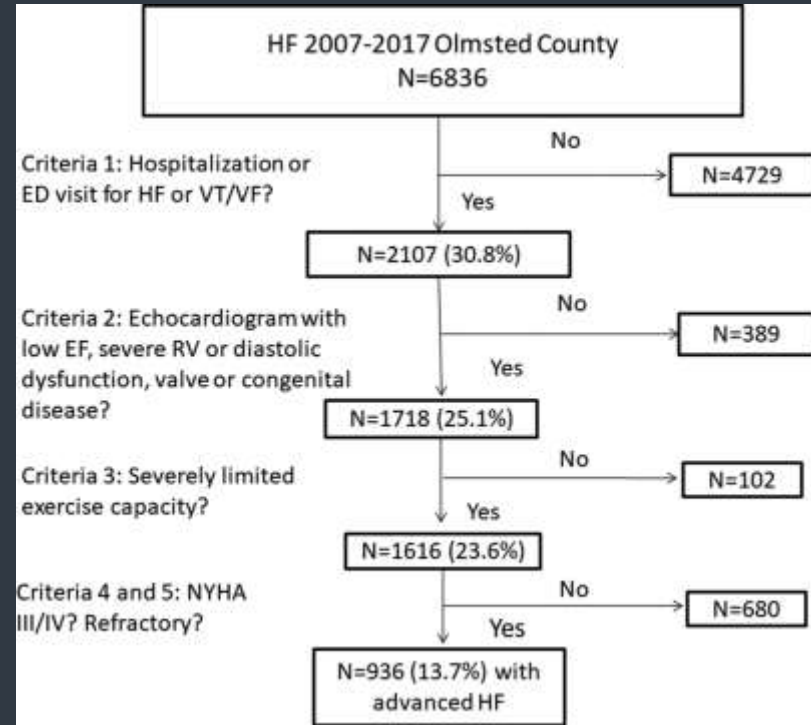
- Reduce cost
- Reduce mortality and co-morbidity
- Reduce the risk of heart failure (prevention)
- Improve QOL



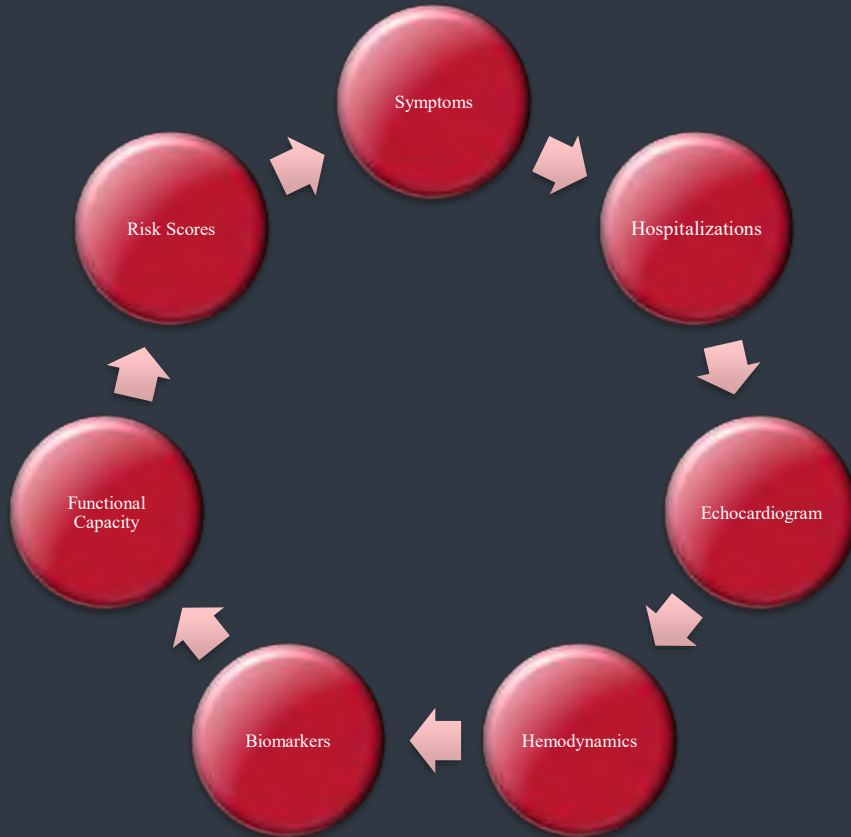
Frequency of Advanced Heart Failure

Olmsted County residents aged ≥ 45 years old, the prevalence of advanced HF (stage D according to the ACC/AHA HF staging criteria) was 0.2% of the overall population, corresponding to **10%** of the HF population.⁸

In a more recent study, of 6836 adults with HF, 936 (**13.7%**) met ESC diagnostic criteria for advanced HF.



What is Advanced Heart Failure?



What is Advanced Heart Failure?

A Pneumonic developed by the ACC/AHA to help identify those with advanced heart failure

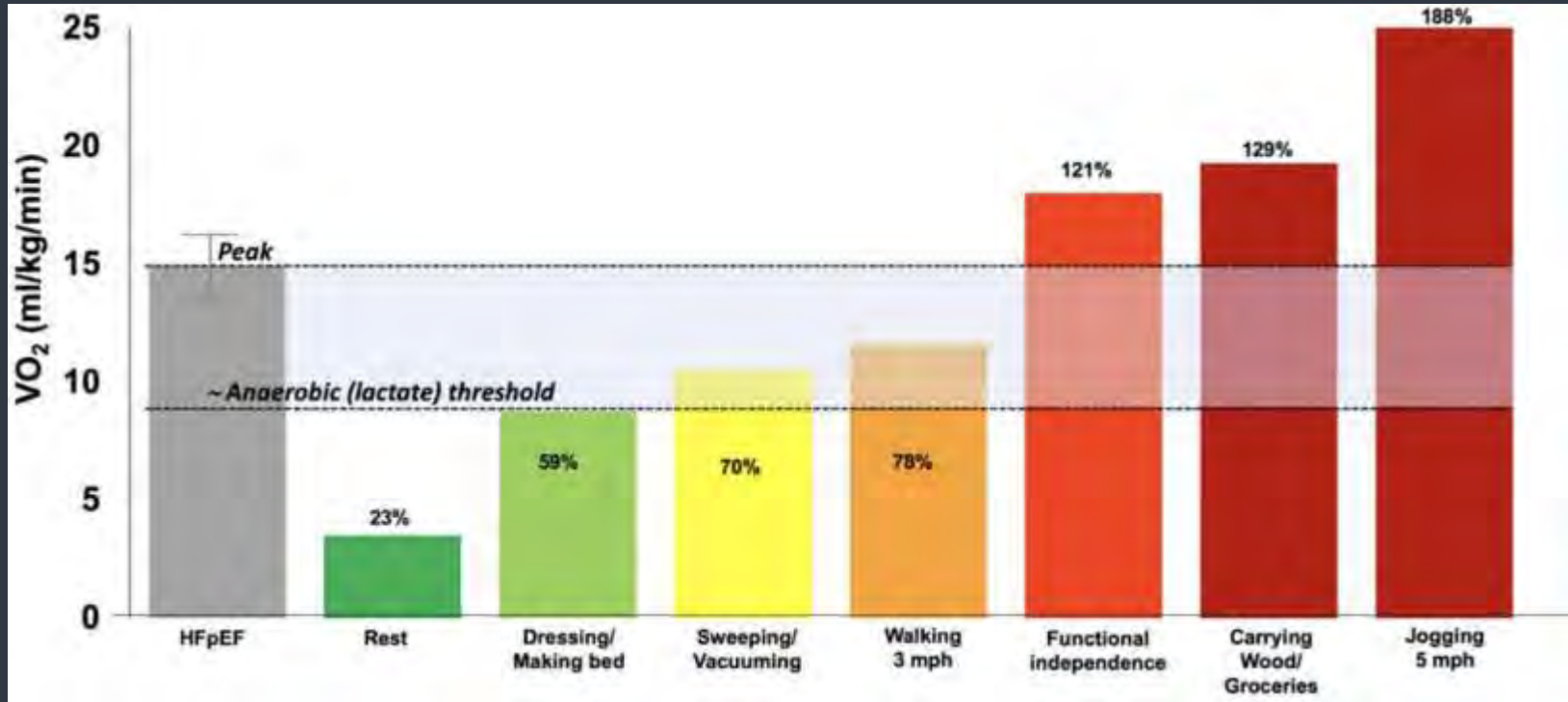
How do we as advanced heart failure cardiologists define advanced heart failure?

- Exercise testing
- Invasive Hemodynamics

I	IV Inotropes
N	NYHA Class IIIb/IV Or elevated bNp
E	End-Organ Failure
E	Ejection Fraction <35%
D	Defibrillator Shocks
H	Hospitalizations >1
E	Edema despite escalating diuretics
L	Low BP
P	Progressive intolerance of GDMT



Functional Capacity in Advanced Heart Failure



Functional Capacity in Advanced Heart Failure

-Cardiopulmonary exercise testing (CPET) is widely used to assess functional limitations in heart failure patients

-Not widely available

-6-minute walk tests (6MWT) is available to anyone and carries comparable prognostic power

Table 2. Studies providing a correlation between 4-minute walking distance and peak $\dot{V}O_2$ in patients with heart failure.

Study	Peak $\dot{V}O_2$
Guyatt and colleagues ²⁷	$r=0.42, p<0.001$
Cabalin and colleagues ¹⁷	$r=0.64, p<0.001$
Rouil and colleagues ⁴¹	$r=0.65, p=0.011^*$
Lucas and colleagues ⁴¹	$r=0.28, p=NS$
Restagno and colleagues ⁴¹	$r=0.56, p<0.05$
Zugck and colleagues ⁴	$r=0.68, p<0.01$
Opasich and colleagues ⁴⁴	$r=0.59, p<0.001$
Cheerham and colleagues ⁴	$r=0.81, p<0.001$
Guazzi and colleagues ⁴	$r=0.68, p<0.001$
Jehn and colleagues ⁴³	$r=0.72, p<0.001$
Carvalho and colleagues ⁴⁴	$r=0.70, p=0.0002$
Forman and colleagues ³⁸	$r=0.54, p<0.001$
Deboeck and colleagues ⁴⁷	$r=0.52, p<0.05$
Omar and colleagues ⁴⁴	$r=0.40, p<0.001$
Uszko-Lecier and colleagues ³⁷	$r=0.58, p<0.001$
Yoshimura and colleagues ⁴⁹	$r=0.62, p<0.001$

*Only in patients with low activity status.



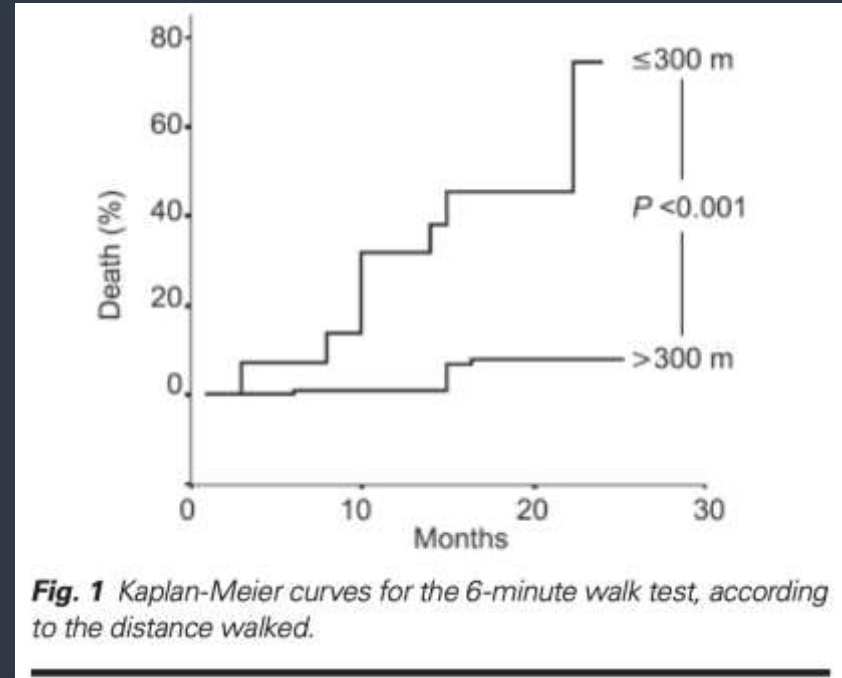
Functional Capacity in Advanced Heart Failure

-6MWD < 350m has a sensitivity of 71% and specificity of 60% for predicting VO₂ max < 14ml/kg/min⁽¹⁾

-Not as helpful with HFpEF

-6MWD ≤ 300 m is indicative of poor prognosis while an even lower 6MWD < 200 m could identify patients with stable HF who are at markedly increased risk of death

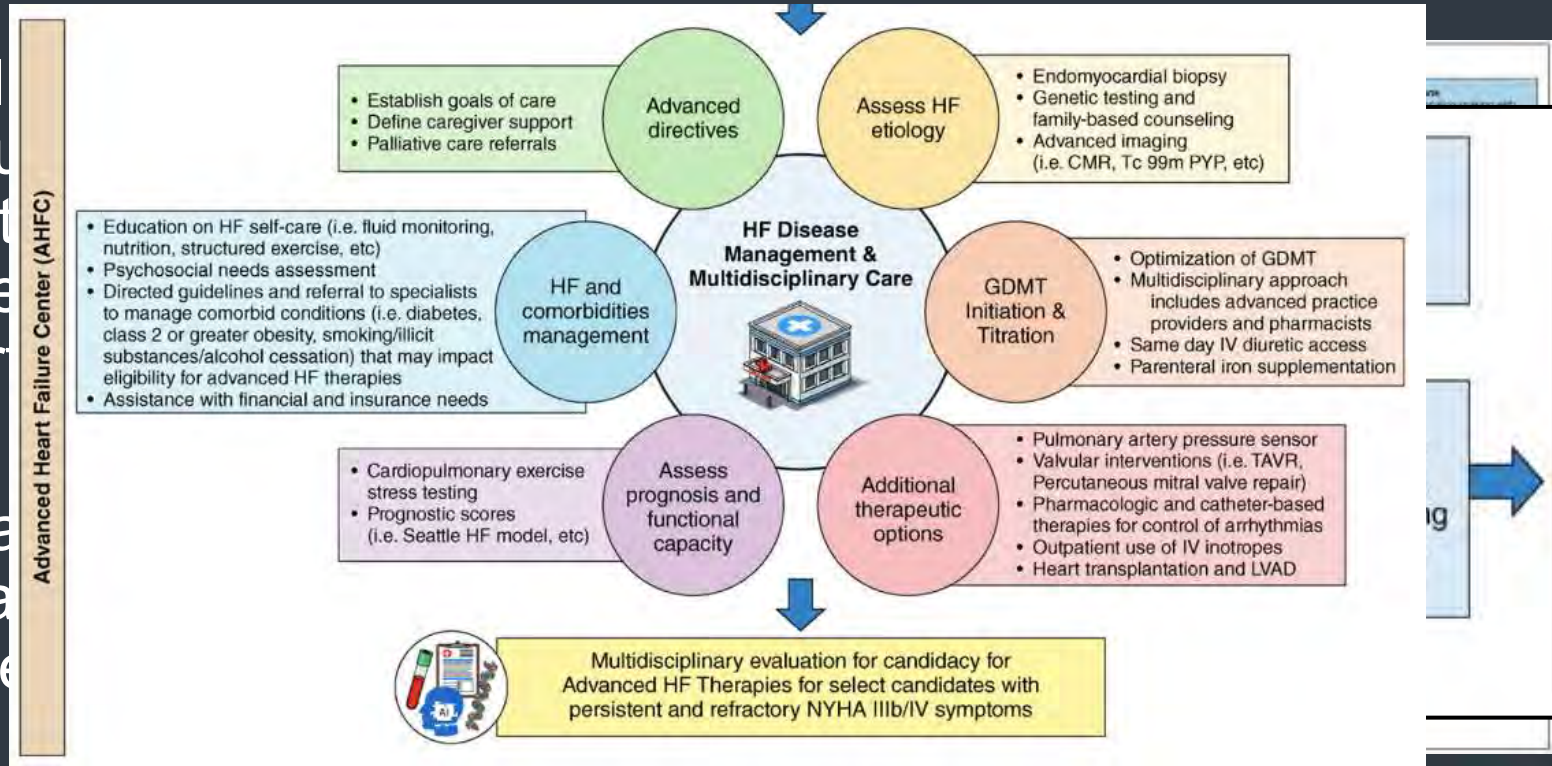
Combining other factors such as LVEF, CHF-p and CI can further define those at highest risk



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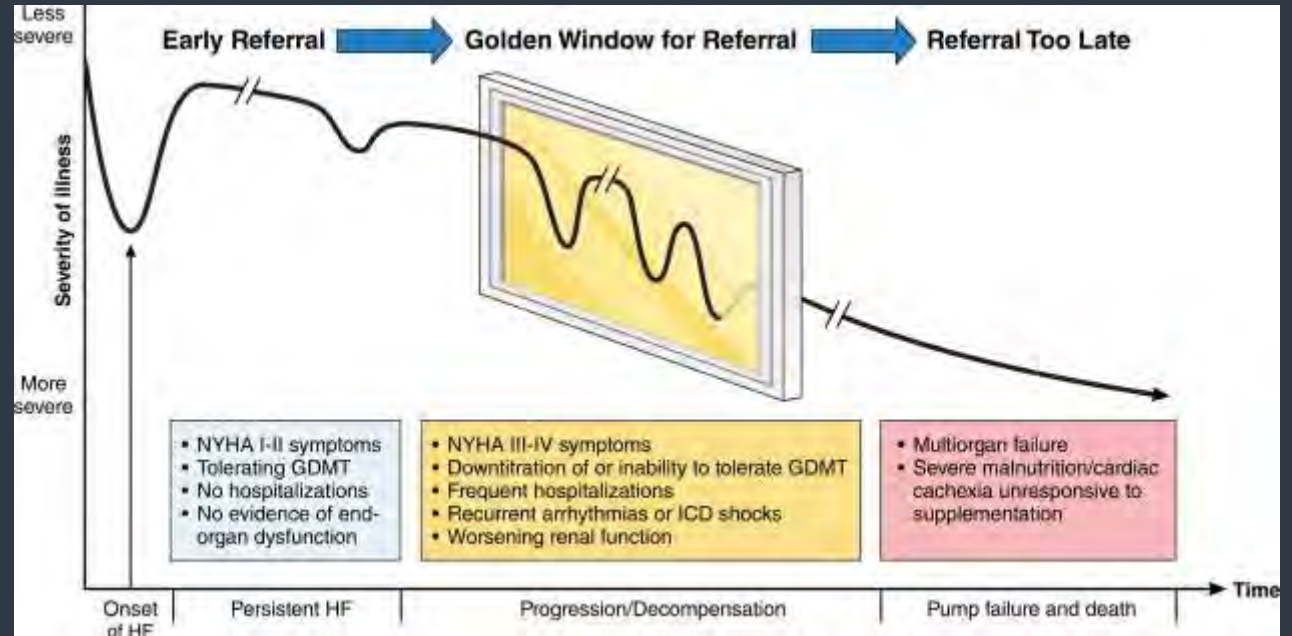
Is It Ever TOO Early for Referral?

Public
Circulation
identities
be referred
heart
Advanced
advanced
center

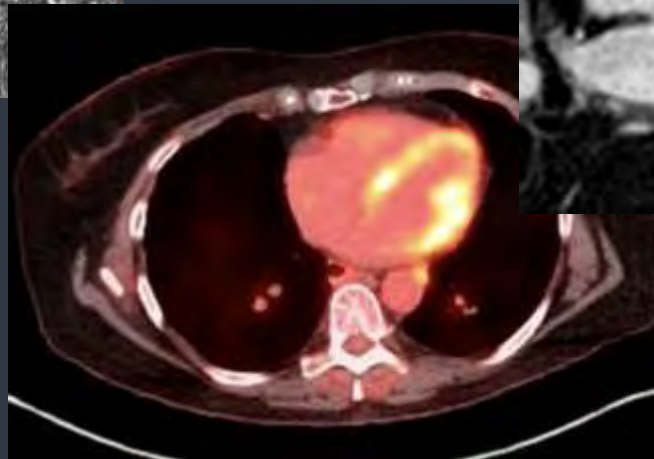
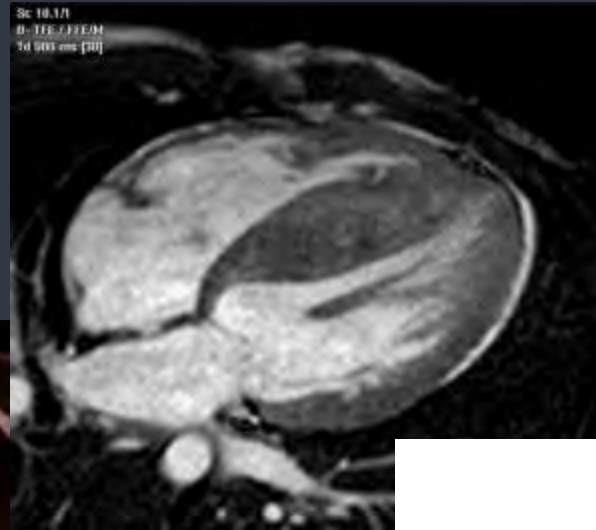
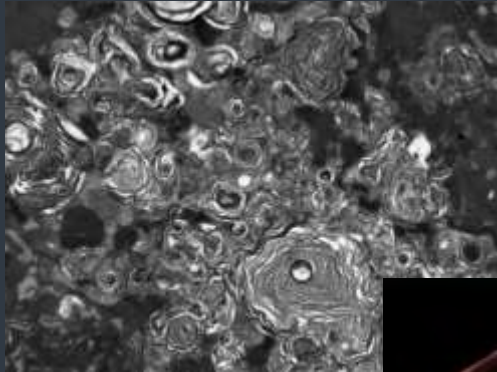


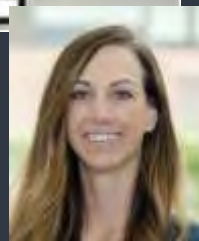
Is It Ever TOO Early for Referral?

Timely referral portends better outcomes for heart failure patients



Is It Ever TOO Early for Referral?





Management of Heart Failure: Advanced Heart Failure Therapies

Dr. Christiaan Barnard, December 3rd, 1967 Cape Town,
South Africa

-53-year-old Louis Washkansky

-Died of pneumonia

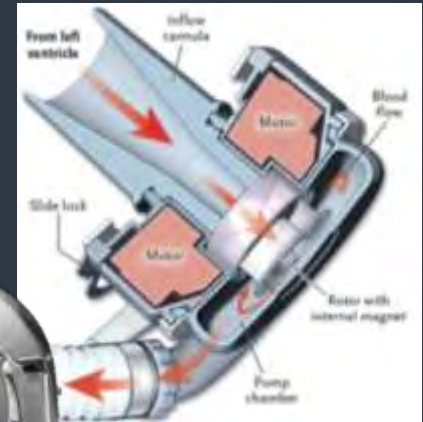
-In the United States 3,817 heart transplant in 2021

-Average survival of a transplanted heart is 12.5 years



Management of Heart Failure: Durable Mechanical Circulatory Support

- Full magnetic levitation**- No bearings- No friction
- Completely intrathoracic**
 - Traditional sternotomy versus thoracotomy approach
- Widened "gaps" to allow for easy blood passage
- Improved hemocompatibility**
- Intrinsic pulsatility**
 - More physiologic flow
- Improved battery life
- Less power consumption**



Beyond Heart Failure: Indications for Cardiac Transplant

End-Stage Heart Failure

Angina



Ventricular Arrhythmia

Restrictive Cardiomyopathies

Summary

- Heart failure is common... SO is advanced heart failure
- Its never to early to refer
- Functional decline, end-organ dysfunction, intolerance to medications, hospitalizations (+1) are signs of advanced heart failure
- Its never to early to refer
- An evaluation for advanced heart failure therapies answers two questions: is it necessary and is it safe
- Its never to early to refer



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