MATTERS OF THE HEART

Caring for Patients with Heart Failure

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Objectives

- Describe trajectory & prognostication of heart failure (HF)
- Review pharmacological and non-pharmacological treatment
- Discuss palliative care role & hospice eligibility criteria
- Management of common symptoms in advanced HF

What is Heart Failure?

Complex Clinical Syndrome

- Structural or functional cardiac disorder
- Impairs ability of ventricle to fill with or eject blood

Characterized By

- Dyspnea
- Exercise intolerance
- Fatigue
- Fluid retention

Epidemiology

Incidence:

- 550K new cases/yr

Prevalence:

- 5.8 million Americans with symptomatic HF

Morbidity:

- 1 million hospitalizations annually
- Most common discharge diagnosis among Medicare beneficiaries
- 80% hospitalized in last 6 months of life

Economics:

- Health care $$ = 40 billion/year

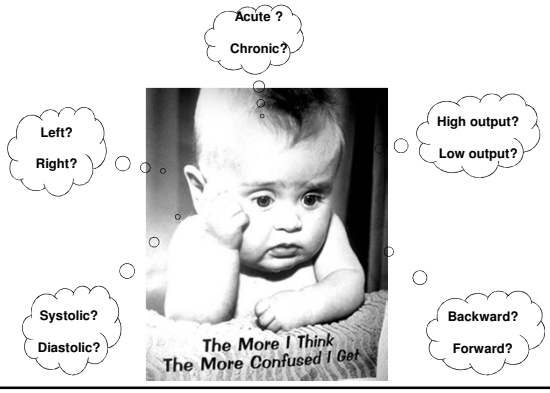
Mortality:

- 250,000 deaths/yr
- 1 yr mortality comparable to certain cancers

Diagnosis

- Clinical history and exam
- 2D Echocardiogram = Gold standard
  - Ejection Fraction (EF)
  - Structural abnormalities
- Brain Natriuretic Peptide (BNP) = Good "rule-out" test

Making sense of the terminology!



Classification

Heart Failure with Reduced Ejection Fraction (HFREF)
…aka Systolic HF

vs.

Heart Failure with Normal Ejection Fraction (HFNEF)
…aka Diastolic HF

HFNEF

- **EF > 50%**
- **Diastolic dysfunction**
  - **Impaired LV relaxation**
  - **Elevated diastolic filling pressures**
  - **Diastolic wall stiffness**
- **HTN : LV hypertrophy**
  - **DM, Obesity, sleep apnea**
- **Valvular disease**
- **Hypertrophic cardiomyopathy**
- **Restrictive cardiomyopathy**

HFNEF

- **Females > males**
- **Majority asymptomatic**
- **Symptoms similar to HFREF**
- **Low tolerance to atrial fibrillation or abrupt hemodynamic changes**
- **Lower incidence of sudden cardiac death**

Disease Severity

- **New York Heart Association (NYHA) classification**
- **American College of Cardiology/American Heart Association (ACC/AHA) classification**

NYHA classification	
Class	**Symptoms**
I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitations, or dyspnea.
II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitations, or dyspnea.
III	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, palpitations, or dyspnea.
IV	Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency at rest. If any physical activity is undertaken, discomfort is increased.

American College of Cardiology/American Heart Association Stages of Heart Failure		
Stage	**Definition**	**Patient Description**
A	High risk for developing HF	HTN, CAD, DM, FHx of Cardiomyopathy
B	Asymptomatic HF Structural heart disease without any symptoms of HF	Previous MI
		LV hypertrophy or systolic dysfunction
		Asymptomatic valvular disease
C	Symptomatic HF Structural heart disease with prior or current symptoms of HF	Known structural heart disease
		SOB, fatigue
		Decreased exercise tolerance
D	Refractory, End-Stage HF	Marked symptoms at rest despite maximal medical therapy

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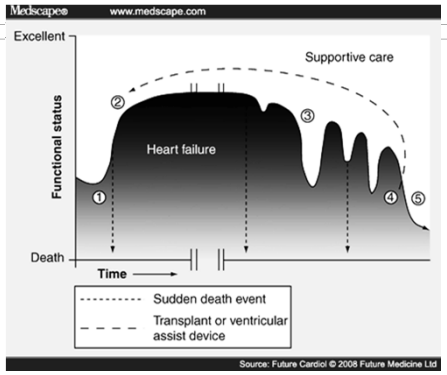
Disease Trajectory



Prognostication

- Challenging
  - High incidence of sudden cardiac death (SCD)
  - Differences in application of treatment guidelines
  - Inter-observer differences in assessing NYHA class
- Several models proposed
  - EFFECT Model
  - Heart Failure Survival Score (HFSS)
  - Seattle Heart Failure Model (SHFM)

Seattle Heart Failure Model (SHFM)

- Tested primarily in patients with SHF
- Both outpatient and advanced HF patients
- Accurate (?) estimate of 1-, 2- and 3- year mortality
- Predictive of mode of death in ambulatory patients with NYHA class II-IV
- http://depts.washington.edu/shfm/app.php

Seattle Heart Failure Model (SHFM)

- Age
- Gender
- Ischemic disease
- NYHA class
- Ejection Fraction
- Systolic BP
- Use of a K sparing diuretic
- Diuretic dose/kg
- Statin use
- Allopurinol
- Hemoglobin
- Lymphocyte count
- Uric Acid
- Sodium
- Cholesterol

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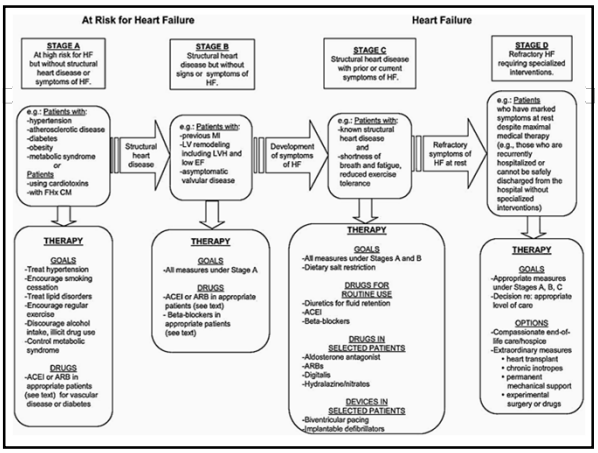
Mainstays of Treatment

- Drugs
- Devices
- Cardiac transplant



HF with Normal EF

- Control BP – systolic and diastolic
- Treat hyperlipidemia
- Rate control if in atrial fibrillation
- Caution when using diuretics, ACE-I, CCB and nitrates
- Coronary revascularization in patients with CAD

HF with Reduced EF

- Start with a diuretic if volume overloaded
  - Mortality benefit
  - Reduced hospitalization rates
- Add drugs with mortality benefit, titrate to target doses
  - ACE-I : all patients
  - ARBs : if unable to tolerate ACE-I
  - BB : NYHA class II, III
  - Aldosterone antagonist + diuretic+ ACE-I: NYHA Class III, IV
  - + Hydralazine+Nitrate (Bidil) – especially in AA

Target doses

Drug	Starting dose	Target dose
ACE-I		
Captopril	6.25 mg TID	50 mg TID
Enalapril	2.5 mg BID	10-20 mg BID
Lisinopril	2.5-5 mg QD	20-40 mg QD
ARBs		
Candesartan	4-8 mg QD	32 mg QD
Losartan	25-50 mg QD	50-100 mg QD
Valsartan	20-40 mg BID	160 mg BID
BB		
Carvedilol	3.125 mg BID	25-50 mg BID
Bisoprolol	1.25 mg QD	10 mg QD
Metoprolol ER	12.5-25 mg QD	200 mg QD
Spirinolactone	12.5-25 mg QD	25-50 mg QD or BID

Digitalis

- No mortality benefit but..
- Does provide symptomatic relief
  - Use after ACE-I/ARBs, BB, diuretics fail to provide relief
- Not recommended as 1st line in
  - Acute exacerbation
  - Systolic dysfunction + Atrial fib

Vasodilators

- Nitroglycerin, Nitroprusside, Nesiritide
- Symptomatic relief in acute decompensation
- Added if symptomatic after maximizing other first line meds
- In chronic HF, oral nitrate combined with hydralazine

Inotropes

- Dopamine, Dobutamine, Milrinone
- Oral agents associated with increased mortality
- Continuous vs. intermittent infusion for palliation of symptoms in patients with refractory end-stage HF
- Need for continuous inotrope infusion = poor prognosis: 20-25% 1 year survival

Adverse Effects

- ACE-I/ARBS
  - Hypotension
  - K retention
  - Renal failure
  - Cough
  - Angioedema
- BB
  - Fluid retention
  - Worsening HF
  - Fatigue
  - Bradycardia, heart block
  - Hypotension
- Digoxin
  - Cardiac arrhythmias
  - GI distress
  - Neurological complaints
- Aldosterone antagonists
  - Hyperkalemia

Bottomline..

- ✓ Titrate meds to target dose for maximal benefit – Survival + Symptom relief

Query 1

When do we discontinue diuretics on end stage heart failure patients?

- Significant hypotension
- Declining renal function

Query 2

Beta-blockers have to be used "cautiously" in patients with heart failure. At what point and how should they be discontinued?

- Significant hypotension or bradycardia
- May retitrate once stable
- Ideal taper 4-6 weeks long…..
- Try some form of taper over a few days

"Yes! That was very loud Sir, but I said I wanted to hear your *HEART!*"

Devices

- Implantable Cardioverter Defibrillators (ICD)
  - Reduces risk of sudden cardiac death
- Cardiac Resynchronization Therapy (CRT)
  - ↓ mortality and hospitalizations
  - Improved QOL

Ventricular Assist Devices (VADs)

- Left, right or BiVad
- Patients with a life expectancy < 2yrs
- Bridge to transplant (BTT)
- Bridge to recovery (BTR)
- Destination therapy (DT)
  - Patient not a transplant candidate
  - Requires permanent mechanical circulatory support

Ventricular Assist Devices

- High risk surgery with complex post-implant care
- Early complications
  - Bleeding
  - Sepsis
  - Multi-organ failure
- Late complications
  - Thromboemblism
  - Infection
- In hospital mortality about 27%, 1 yr survival nearly 60%
- Improved quality of life

Query 3

When to turn a LVAD off? Is this is just one more decision family has to make?

Approaching End of Life - VAD

- Turning off LVAD
  - Ethically challenging
  - LVAD is not a replacement treatment
  - Patients have the right to refuse treatment
  - Unethical to continue a treatment patient has refused
- Preparedness planning
  - Psychosocial
  - Caregiver concerns
  - QOL
  - Ethics

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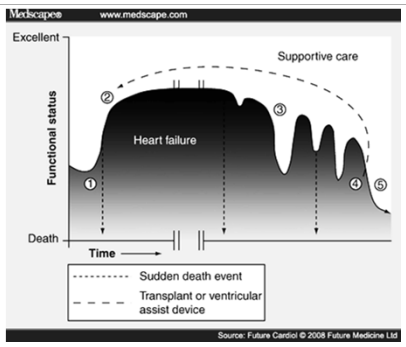
Role of Palliative Care

- Supportive care
  - Education and self management
  - Communication
  - Psychosocial and spiritual issues
  - Symptom management
- Decision-making
  - Preferences for CPR, need for ICD
  - Cardiac transplant, LVAD
  - Advance directives

Role of Palliative care



Identifying the Patient with End Stage HF

- Marked decline in functional ability and quality of life
- Frequent hospitalizations for exacerbations despite:
  - Maximal medical therapy
  - Identification and treatment of reversible causes

Approaching End Stage HF

- Educate, educate, educate
- Revisit goals of care
- For patients with ICD - Discuss if and when to turn off ICD
- If patients opt for LVAD as DT or BTT: preparedness planning

Current Hospice Guidelines

- NYHA class IV
- Optimal medical management
  - Patient refuses device (ICD/CRT/LVAD) or transplant
  - Patient not a device or transplant candidate
- Supportive but not required
  - LVEF < 20%
  - Treatment resistant, symptomatic arrhythmias
  - h/o cardiac arrest or CPR
  - Unexplained syncope
  - Embolic stroke of cardiac origin
  - Concomitant HIV

Query 4

I am curious about maximal medical management of heart failure patients whose death is imminent due to another co-morbidity (ex. ESRD and have decided to forgo dialysis).

- If hypotensive, but still able to take PO meds, cut back instead of stopping meds
- If death is imminent, will likely need to discontinue meds contributing to hypotension or circulatory failure

When the Goal is Palliation….

- Optimize medical treatment – known to palliate symptoms and prolong life
  - Diuretics, fluid and salt restriction
  - ACE-I/ARBs/BB
  - Small, stable changes in BUN/Creat acceptable
  - Moderate hypotension OK
  - Monitor weight

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Symptom Burden

- Large proportion of patient families report quality of life (QOL) as being poor to fair in the last week of life
- The 4 most common symptoms reported by patients/family members in the last 6 mths of life
  - Pain
  - Dyspnea
  - Fatigue
  - Confusion

Symptoms

- Dyspnea and pain : Opioids, Benzodiazepines
- Fatigue/depression: Stimulant (Methylphenidate)
- Sleep disturbance: CPAP/BiPAP
- Anorexia
- Weight loss
- Anxiety: Benzodiazepines

Pain

- Prevalence of pain increases with NYHA class
  - 90% of patients with Stage IV HF
- Often described as generalized/diffuse pain
- So far, no HF pain syndrome described
  - ? HF + comorbidities
- Undertreated despite known high prevalence!
- Rx mainstays
  - Avoid NSAIDs
  - Low dose opioids, titrate up as needed
  - OA: joint injections

Dyspnea

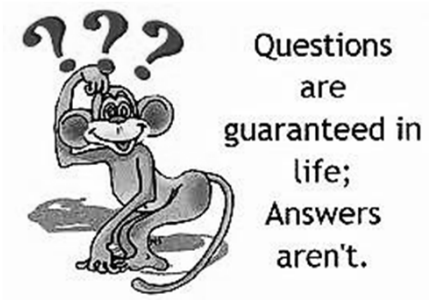
- Maximize HF medications if tolerated
- Low dose opioids
- Oxygen: only if hypoxic
- Continuous inotrope infusion ($$$ + ↑mortality)
- Nitrates for afterload reduction
- Cochrane review of dyspnea in COPD
  - Hawthorn extract
  - Breathing training
  - Chest wall vibration

Other Symptoms

- Fatigue
  - Underlying cause
  - Ritalin
  - Energy conservation techniques
  - DME or adaptation of home environment
- Depression
  - Consider Ritalin or an SSRI
- Anxiety
  - Benzodiazepines

Summary

- HF is a major public health problem
- Treatment of HF varies by stage
- Prognostication is challenging
- Sudden cardiac death is common and may occur at any time during the course of the disease
- Always attempt to achieve target doses of drugs with proven mortality benefit
- Maximal medical therapy should be continued as long as possible due to palliative benefits
- Educate = empower, ? Action plans



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