

Managing Decompensated Acute Heart Failure

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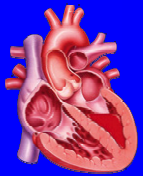
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Section of Heart Failure/Transplant

Decompensated Heart Failure

- Not well defined
- Assumes a compensated or “steady state”
- Used interchangeably with exacerbation
- Symptoms and/or signs of congestion
- Symptoms and/or signs of low output



Patient Classification

Congestion at Rest

No

Yes

No

Yes

Warm & Dry
PCWP normal
CI normal
(compensated)
RARE

Warm & Wet
PCWP elevated
CI normal
FAIRLY COMMON

Cold & Dry
PCWP low/normal
CI decreased
RARE

Cold & Wet
PCWP elevated
CI decreased
MOST PATIENTS
Normal SVRI High SVRI

Inotropic Drugs

Dobutamine
Milrinone

**Low
Perfusion
at Rest**

Evidence-Based Approach to

LVD

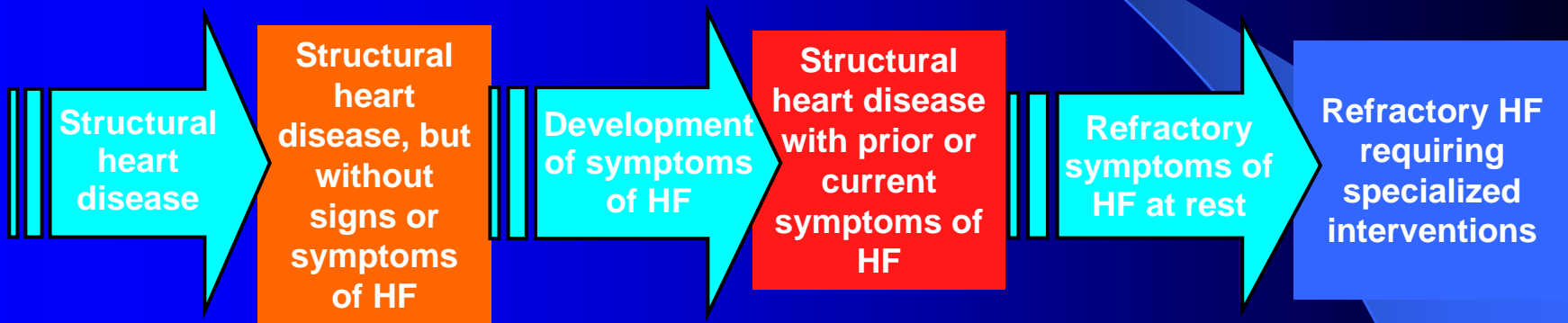
At Risk for HF

HF

Stage B

Stage C

Stage D



CAPRICORN*

US Carvedilol Trials

COMET

COPERNICUS

CAPRICORN*

*CAPRICORN included post-MI patients with LVD, with or without symptoms of HF.

Hunt SA et al. *Circulation*. 2005;112:1825–1852. Packer M et al. *N Engl J Med*. 1996;334:1349–1355.

Poole-Wilson PA et al. *Lancet*. 2003;362:7–13. Packer M et al. *N Engl J Med*. 2001;344:1651–1658.

The CAPRICORN Investigators. *Lancet*. 2001;357:1385–1390.

Stages of CHF

- Stage A: at high risk for heart failure but without structural heart disease or symptoms
 - Htn, tachycardia, CAD, DM, etoh, IVDU, FH
- Stage B: structural heart disease but without symptoms
 - Previous MI, LV systolic dysfunction, valvular disease
- Stage C: structural heart disease with prior or current symptoms
- Stage D: refractory CHF requiring specialized interventions

NYHA Classification

- NYHA I: no symptoms. Corresponds to stage B
- NYHA II: symptoms at moderate exercise
- NYHA III: symptoms with minimal exercise/ADLs
- NYHA IV: symptoms at rest
- Subjective classification
- A notation of a patient's functional class and stage should be noted on all outpatient visits

Diagnosis

- Symptoms: SOB, DOE, PND, Orthopnea, n/v, bloating, dizziness, palpitations
- Signs: rales, JVD, hepatomegaly, S3, S4, edema
- Diagnostic tests
 - echo
 - Basic metabolic panel
 - Liver function tests
 - CBC
 - BNP
 - CXR
 - EKG

Etiologies

- New or worsened ischemia
- Hypoxemia
- Progression of left ventricular dysfunction
- Anemia or blood loss
- Newly prescribed beta blocker
- NSAIDS
- Hypertension
- New onset atrial fibrillation
- Increased salt intake
- Missed medication
- Alcohol
- Inadequate diuresis
- Sub-optimal medication regimen

Diuresis

- Loop Diuretics
 - Frequency
 - Continuous infusion
- Metolazone
- Spironolactone

		STARTING DOSE	2 HOURS	MAINTENANCE DOSE	
				SATISFACTORY DIURESIS	UNSATISFACTORY DIURESIS
GOOD RENAL FUNCTION	NO PRIOR DIURESIS	40 MG		40 MG BID	80 MG BID
	PRIOR DIURESIS	80 MG		80 MG BID	160 MG BID
POOR RENAL FUNCTION		100 MG		100 MG BID	200 MG BID

Indications for Inotropes

- Short term use for acute decompensation
- Palliative care to allow patient to go home from hospital
- Bridge to transplant or left ventricular assist device

Inotropes

- Beta Agonists (dobutamine, dopamine)
- Phosphodiesterase Inhibitors (milrinone, amrinone)
- SE: tachyarrhythmias, hypotension, decreased effectiveness

Inotropes

- Increase contractility
- Decrease afterload
- Increase CO/CI
- Decrease PCWP/LVEDP

Vasodilators

- Nitroprusside
- Nitroglycerine
- Nesiritide

Vasodilators

- Decrease afterload
- Decrease preload
- Increase CO/CI
- Decrease PCWP

“Renal Dose” Dopamine

- Myth
- Unpredictable effects
- Worse mesenteric ischemia than originally thought
- No benefit in preventing ARF or dialysis
- Should not be used routinely.

Pulmonary Artery Catheters

- Not Risk Free
 - Infection
 - Bleeding
 - Vessel damage
- How will it inform me?
- Accuracy/Reliability: improved when following trends, Fick method more accurate in LV dysfunction
- Interpretation

Pulmonary Artery Catheters

- Patient stops responding to empiric therapy
- Patient does not respond to empiric therapy
- Worsening pre-renal azotemia in obviously fluid overloaded patient
- Volume management
- Pre-transplant/LVAD evaluation
- Transplant waiting list evaluation

Case Study

- AF is a 58 year old AA male with known dilated cardiomyopathy and congestive heart failure. He came in to his primary care provider today complaining of not being able to sleep at night. Every time he lays down, he has to sit right up because he can't breathe.

Case Study

- He normally sleeps on 2 pillows but for the last week has had to sleep on 4 waking up 2-3 times per night to just sit up suddenly to breathe. Last night he had to sit up in a recliner to breathe. He gets short of breath walking from the chair to the bathroom, but 2 weeks ago he could walk 4 blocks without stopping to catch his breath.

Case Study

- PMHx: HTN, Type II DM, COPD
- SH: Smokes 1ppd x 45 years
ETOH: 1-2 six packs/week No IVDA
- Married with 4 children under age of 10.
Unable to work for 2 years, was a
carpenter's helper.

Case Study

His home medicines are:

- lisinopril 20 mg po qd
- glyburide 5 mg qd
- digoxin 0.25 mg po qd
- atorvastatin 10 mg qd
- furosemide 80 mg po qd
- Combivent MDI 2 puffs tid and PRN

Case Study

ECHO 1 year ago:

LV dilated with mild concentric hypertrophy and global hypokinesis.

EF 30%. Valves normal. Mild MR and moderate TR. PAS 40-45 mmHg.

ECHO 1 month ago:

LV dilated without hypertrophy and global hypokinesis. EF 25%. Valves normal. Moderate to severe MR and severe TR. Mild AR. PAS 65-70 mmHg.

Case Study

Physical Exam:

T: 98.8 HR: 116 BP: 92/44

WT: 195 (usual weight 180) HT: 6'1"

GENERAL: Thin black male using accessory muscles to breathe and appearing very anxious. Leaning forward on overbed table.

Case Study

NECK: JVP at earlobes with earlobe pulsation.

CHEST: Increased AP diameter. Clavicle and intercostal retractions and increased work of breathing. No crackles, scattered wheezes. RR 32 at rest. Activity or talking results in Cheyne-Stokes pattern. SpO₂ 96% on 2L NC.

Case Study

CARDIOVASCULAR: Visible and palpable RV pulsation. Heart rhythm regular with occasional ectopy. Summation gallop. II/VI MR murmur best heard at apex. II/VI TR murmur that increases with inspiration. Fixed split S2.

Case Study

ABDOMEN Abdomen distended, firm and nontender. Flat to percussion. Liver edge not palpable.

Liver span 10 cm extending 5cm below costal margin. Positive HJR.

EXTREMITIES: 2+ edema to knees bilaterally.

Case Study

Labs:

120 | 102 | 65 / 450 8.2 \ 8.4 / 224

3.6 | 25 | 2.4 \ /25.5 \

ABG: 7.37 pCO₂ 50 pO₂ 88 HCO₃ 24

SaO₂ 96% Base excess -1.4

alk Phos 385 t. bili 2.3

Alb 2.9

Case Study

- Does this patient need to be intubated?
- Is his oxygen transport adequate?
- Does this patient need a Swan?
- Does this patient need diuresis?
- What would you give and how much?
- Does this patient need inotropes?
- What drug and why? What dose?
- Does this patient need dopamine?
- What should be done about his home regimen?

Advanced Therapies

- CRT
- LVAD
- Transplant
- Acorn (CorCap)
- Ventriculectomy (Batista, Dor)
- TMR, high-risk CABG

Evaluation for Advanced Therapy

- Failing medical therapy
- Ischemia despite revasc.
- Refractory arrhythmias
- Acute MI
- Acute myocarditis etc.

Medications

- Acei or arb; afterload reduction
- Diuretics; volume control
- Beta-blocker; HR, BP, reduced oxygen demand, reverse remodel
- Spironolactone; BP, reverse remodel
- Digoxin; + inotrope

In Summary...

- Decide on volume and perfusion status
- Look hard for exacerbating factor(s)
- Generally, increase perfusion to improve diuresis
- Decide on short and long term prognosis of the patient to assess need for further therapies