

Complex Heart Failure in the Out-Patient Setting

**Sue Wingate RN, PhD, CRNP
Kaiser Permanente Mid-Atlantic**

The Burden of Heart Failure

- 5 million in US with heart failure → 10 million by 2040; 23 million world-wide
- Annual mortality 21% in men, 17% in women
- 74 million have risk factors for heart failure (Stage A)
- 500,000 new cases/yr → 772,000 by 2040
- 12-15 million office visits/yr
- 6.5 million days in hospital/yr
- \$27-\$38 billion/yr costs with 10% due to drugs



Heart failure is the final common pathway of many risk factors and cardiovascular illnesses

What makes out-pt management so complex?

- Co-morbidities

Typical Heart Failure Patient???

- 50 yrs old
- Hypertension
- Ejection Fraction 30%
- Normal sinus rhythm

- 79 yrs old
- CAD s/p CABG
- Diabetes
- CKD
- Atrial fibrillation
- Ejection fraction 30%
- Arthritis
- Depression
- Cognitive impairment
- Lives alone

What makes out-pt management so complex?

- Co-morbidities
- Medication titration
- Psychosocial issues
- Volume management
- Integrating device and HF management
- Balancing beneficial & untoward effects of interventions
- Palliative care and end-of-life issues

Some topics to consider today:

- Volume management
- Effect of comorbid conditions on HF management
- Diagnostics—when to use?
- Integration of device therapy
- End of life medication issues

Case Study Presentation #1

- 64 yo WF with progressive edema & DOE
- **History:** Ischemic HF (EF 25%--declined ICD), CHD s/p MI & CABG, osteoarthritis, diabetes
- **Meds:** ASA, carvedilol 25 mg bid, enalapril 20 mg qd, furosemide 40mg qd, glipizide, simvastatin 40 mg qd
- She has been recently using OTC ibuprofen for pain relief
- She enjoys Chinese food & often eats out at a local Chinese restaurant

Case Study Presentation #1

- Exam: bibasilar crackles, II/VI HSM apex, 2+ bilat LE edema to mid-calves
- Lab: SCr 2.1 mg/dl (1.5 mg/dl six mos ago), urine with 3+ protein

Case Study Presentation #1:

What factors led to her decompensation & why is she resistant to her diuretic?

- Dietary noncompliance
- Use of NSAIDs
- Worsening renal function
- Proteinuria, most likely due to diabetic nephropathy

Case Study Presentation #1

What is the impact of CKD and proteinuria on renal function in HF?

**Renal insufficiency + heart failure
=
magnified diuretic resistance**

- Accumulation of endogenous organic anions compete with drugs for transport into tubule
- Total delivery of diuretic to kidneys is proportional to renal blood flow, which is diminished in renal failure and heart failure

Case Study Presentation #1

What is the impact of CKD and proteinuria on renal function in HF?

--Diuretics are highly protein bound in serum. When protein is spilled in urine, diuretic is still bound to it and is excreted in urine

--Patients with heavy proteinuria (such as in diabetic nephropathy) will be much more resistant to diuretic action than their degree of renal dysfunction would predict

What adjustments in the diuretic regimen would you suggest for this patient?

- Decrease the dose of diuretic
- Stop the diuretic
- Increase the dose of diuretic
- Decrease the frequency of diuretic dosing

Space reserved for
Audience Response
Graph

Case Study Presentation #2

- 74 yr old male with recently diagnosed non-ischemic HF, EF 30%, LV 6.8 cm, moderate MR
 - Other PMH: HTN, COPD (prior smoker), obese
 - Meds: Metoprolol CR/XL 100 mg qd, lisinopril 20 mg qd, furosemide 40 mg qd, ipratropium inhaler 2 sprays QID, felodipine 10 mg qd
- He says he has a worse cough now since he has started on all these new pills

Case Study Presentation #2: How should the cough be evaluated?

- What are the characteristics of the cough?
- What is his volume status? Orthopneic?
- How well-controlled is his COPD?
- Does the cough really bother him

Case Study Presentation #2:

Cough evaluation

- Mostly occurs at night when lying down
- Non-productive
- Exam: JVP 9-10 cm, lungs clear, 1+ bilateral LE edema
- Extra inhaler sprays don't seem to help
- Really wants to stop medications as he thinks one of them is the cause

What do you plan to do first for this pt's cough?

- Switch to an ARB
- Increase his diuretic dose
- Decrease the dose of the ACE-I
- Switch the patient to a different ACE-I

Space reserved for
Audience Response
Graph

Case Study Presentation #3

- 66 yr old male hospitalized with new-onset palpitations and dyspnea
- Other Hx: HTN, hyperlipidemia, obesity, quit EtOh 3 yrs ago, no tobacco
- 67", 207#, BMI 32.1, normal renal fx
- AFIB with RVR → tx'd with diltiazem
- Echo: LA 4.8, LV 5.3, LVEF 25%, mod MR
- Pharm nuclear study: LVEF 29% rest & stress, mildly enlarged LV, global HK, no perfusion defect

Case Study Presentation #3

- D/C meds: lisinopril 10 mg qd, diltiazem 180 mg qd, warfarin, lovastatin 40 mg qd, furosemide 20 mg
- Meds were adjusted and titrated:
 - Lisinopril 20 mg qd
 - Carvedilol 50 mg BID
 - Digoxin .25 mg qd
 - Diltiazem & furosemide were stopped
 - Warfarin continued, adjusted to INR

Case Study Presentation #3

- He had class II symptoms, was euvolemic, remained on meds, was still in AFIB v-rate 80-90s, and echo was repeated 8 months after initial presentation

	LA	LV	LVEF	MR
Initial	4.8	5.3	25%	Mod
8 mos	5.8	5.9	20%	Mod

What would be the next intervention for this pt?

- None at this time
- Discuss ICD implantation
- Start amiodarone
- Perform elective cardioversion

Space reserved for
Audience Response
Graph

Case Study Presentation #4

- 46 yr old AA female admitted with progressive fatigue , DOE and +/- chest pain; 3 admissions in past 18 mos for asthma
- PMH: asthma, HTN, dyslipidemia, morbid obesity, bilateral OA of knees*
- Social: single parent, works 2 jobs, lives with son, no smoking, rare EtOh
- Echo: LVEF 30%
- Cath: Normal coronaries

*Xray: DJD, almost complete loss of medial joint spaces in both knees

Case Study Presentation #4

- Discharge Meds:
 - Furosemide 40 mg QD
 - Diltiazem 240 mg BID
 - Lisinopril 40 mg QD
 - Etodolac 400 mg TID
 - Nitroglycerin
transdermal 0.2mg/hr
on am/off pm
 - Losartan 25 mg QD
 - Advair diskusTM 250-
50 one puff BID
 - VytorinTM 10-80 mg
QD
- HR 113, BP 160/90
- BUN 19, SCr 1.0, K+
4.3
- Ht 64", Wt 315#, BMI
54.1

What would you do first?

- Start beta blocker
- Stop calcium blocker
- Stop iodine
- Increase dose of losartan

Space reserved for
Audience Response
Graph

Case Study Presentation #4

- Discharge Meds:
 - Furosemide 40 mg QD
 - Diltiazem 240 mg BID
 - Lisinopril 40 mg QD
 - Etodolac 400 mg TID
 - Nitroglycerin
transdermal 0.2mg/hr
on am/off pm
 - Losartan 25 mg QD
 - Advair diskusTM 250-
50 one puff BID
 - VytorinTM 10-80 mg
QD
- HR 113, BP 160/90
- BUN 19, SCr 1.0, K+
4.3
- Ht 64", Wt 315#, BMI
54.1

Case Study Presentation #5

- 70 yr old AA male hosp with progressive DOE
- PMH: HTN, CKD
- 2 yrs prior, echo with LVEF 10% (no follow up)
- Current LVEF 15%, LA 4.5, LV 5.7
- Pharm nuclear study without perfusion defect
- EKG: NSR, IVCD qrs .13

Case Study Presentation #5

- Meds titrated:
 - Carvedilol 25 mg BID
 - Lisinopril 10 mg QD (limited by K level)
 - Furosemide 40 mg QD
 - Felodipine 10 mg QD
- Presented to clinic with rapid atrial flutter
 - Felt “fine”
 - BP 124/62

(Lab: SCr 2.3, BUN 27 K 4.6)

Intervention?

- Increase beta blocker
- Start amiodarone
- Perform cardioversion
- Add digoxin

Space reserved for
Audience Response
Graph

Case Presentation #6

- 86 yr old male, widowed, lives alone, daughter involved
- Non-ischemic HF, atrial fibrillation, DM, HTN, CKD, BPH, OA
- SDB/OSA on CPAP
- Meds: carvedilol, warfarin, lisinopril, lasix, digoxin, tramadol prn, flomax, glucotrol,
- Echo EF 20%, BNP 900, BUN 54 SCr 2.2, K 4.2, Hgb 9.6, sodium 131
- NYHA IV

EFFECT Heart Failure Risk Scoring System (hosp pt)

Age (years)	
Resp Rate (20-45)	
Systolic BP	(select range)
BUN (max of 60 mg/dl)	
Sodium (<136 mEq/L)	Yes No
Cerebrovascular Disease	Yes No
Dementia	Yes No
COPD	Yes No
Hepatic Cirrhosis	Yes No
Cancer	Yes No
Hgb <10.0 g/dL*	Yes No

*not needed for 30 day score

Lee et al. JAMA 2003;290(19):2581-7 www.ccort.ca/chfriskmodel.asp

Mortality Risk

Score	30-Day Mortality	1-year Mortality
≤60	0.4	7.8
61-90	3.4	12.9
91-120	12.2	32.5
121-150	32.7	59.3
>150	59.0	78.8

EFFECT Risk Score for this patient

Age (years)	86
Resp Rate (20-45)	36
Systolic BP	104
BUN (max of 60 mg/dl)	54
Sodium (<136 mEq/L)	Yes
Cerebrovascular Disease	No
Dementia	No
COPD	No
Hepatic Cirrhosis	No
Cancer	No
Hgb <10.0 g/dL*	Yes

30 day Mortality:
Score 146
32.7%

1 yr Mortality:
Score 166
78.8%

*not needed for 30 day score

Medication Appropriateness

