The Palliation of End-Stage Heart Disease

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Internal Medicine, Palliative Medicine
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“It is easier to die of Cancer than Heart or Renal failure”

John Hinton (Medical Attending Physician) 1963
Objectives

- To define Congestive Heart Failure (CHF)
- To gain an understanding of what a CHF patient experiences at end of life
- To be familiar with medications used in CHF
- To employ a symptom-oriented approach to CHF
- To discuss prognostication in CHF
Heart Failure

- The inability of heart to meet the metabolic demands of the body
New York Heart Association (NYHA) Classification

- Class 1 – No dyspnea (but low EF on echo)
- Class 2 – Dyspnea on strenuous activity
- Class 3 – Dyspnea on activities of daily living
- Class 4 – Dyspnea at rest
Heart Failure

- NYHA Grade 4
  - Dyspnea at rest
  - Often have hypotension
  - Clinical features of CHF
  - Typically EF < 20%
    - (Grade 4 Ventricle)
- Right Atrium
- Tricuspid Valve
- Right Ventricle
- Pulmonic Valve
- Pulmonary Arteries
- Pulmonic Veins
- Left Atrium
- Mitral Valve
- Left Ventricle
- Aortic Valve
- Aorta
Mechanisms

- Ventricular Failure
  - Cardiac Output
  - Arterial Pressure

  ↑ Sympathetic
  ↑ Angiotensin II
  ↑ Aldosterone
  ↑ Vasopressin

- Systemic Vascular Resistance
- ↑ Blood Volume
- ↑ Venous Tone
- ↑ Venous Pressure
- Pulmonary Edema
- Systemic Edema

↓ Atrial Natriuretic Peptide
Natural History

- May develop slowly or suddenly
- Often ends in sudden death
- Main cause coronary heart disease
- Also caused by:
  - hypertension, alcohol, viruses, metabolic disorders, valvular disease, cardiomyopathies, congenital abnormalities
Natural History

- 1-2% of general population, 20% of elderly (Hauptman 2005)
- 1M discharged with CHF yearly in U.S. (Hauptman 2005)
- Median survival:
  - grades 3 and 4 - 1 year
  - grades 1 and 2 - 5 years (Taylor 2003)
  - 16 months from first hospitalization (Hanratty 2002)
- Great effect on quality of life
“Joyce, write this down in Mr. Cutler’s file: “thump ... thump-thump ... thumpety-thump ... boink.”"
Clinical Features

- Shortness of breath
- Swelling of feet & legs
- Chronic lack of energy
- Difficulty sleeping at night due to breathing problems
- Swollen or tender abdomen with loss of appetite
- Cough with frothy sputum
- Increased urination at night
- Confusion and/or impaired memory
Clinical Features

Similarities to Cancer

- Dyspnea
- Cachexia/weight loss
- Lethargy/poor mobility
- Pain
- Anxiety & depression
- Insomnia & confusion
- Postural Hypotension
- Jaundice
- More infections
- Polypharmacy
- Fear of the future

Clinical Features

Differences From Cancer

- More edema
- Predicting death more difficult
- Mistaken belief condition more benign than cancer
- No local pressure effects
- Less anemia
Comparison Between Terminal Illnesses

(J Pain and Symp Manage, 2006)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cancer</th>
<th>AIDS</th>
<th>HD</th>
<th>COPD</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>35-96%</td>
<td>63-80%</td>
<td>41-77%</td>
<td>34-77%</td>
<td>47-50%</td>
</tr>
<tr>
<td>Depression</td>
<td>3-77%</td>
<td>10-82%</td>
<td>9-36%</td>
<td>37-71%</td>
<td>5-61%</td>
</tr>
<tr>
<td>Delirium</td>
<td>6-93%</td>
<td>30-65%</td>
<td>30-65%</td>
<td>18-32%</td>
<td>18-33%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>32-90%</td>
<td>54-85%</td>
<td>69-82%</td>
<td>68-80%</td>
<td>73-87%</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>10-70%</td>
<td>11-62%</td>
<td>60-88%</td>
<td>90-95%</td>
<td>11-62%</td>
</tr>
<tr>
<td>Anorexia</td>
<td>30-92%</td>
<td>57%</td>
<td>21-41%</td>
<td>35-67%</td>
<td>25-64%</td>
</tr>
</tbody>
</table>
Experience of Patients

**Lung Cancer**
- Clearer trajectory – able to plan for death
- Initially feel well but told you are ill
- Good understanding of diagnosis and prognosis
- Relatives anxious
- Swinging between hope and despair

**Cardiac Failure**
- Gradual decline, acute deterioration, sudden death
- Feel ill but told you are well
- Little understanding of diagnosis and prognosis
- Relatives isolated and exhausted
- Daily grind of hopelessness

(Murray 2002)
Experience of Patients

Lung Cancer
- Cancer takes over life
- Treatment dominates life
- Feel worse on treatment
- Financial benefits accessible
- Services available in the community
- Care prioritized as “cancer” or “terminal”

Cardiac Failure
- Much morbidity
- Shrinking social world
- Feel better on treatment
- Less access to financial benefits
- Services less available in the community
- Less priority as “chronic illness”
Pulmonary Edema
“No, HDL and LDL were not the robots in Star Wars.”
Management

- **Diet**
  - Must be palatable
  - Frequent light meals
  - Give vitamins

- **Exercise**
  - Appropriately tailored
  - Increases well-being
  - Possible reduction in arrhythmias
  - Improved cardiac function
Management

- Medication optimization
- Reduce modifiable risk factors
- Consider anticoagulation
- Consider pacemakers/implantable defibrillators
- Consider outpatient Inotropes (Nanas, 2004)
Classic Pharmacologic Management

- Ace-I (Angiotensin II antagonists) (HOPE Trial)
- B- blockers (US Carvedilol Study, CIBIS II, Merit, BEST, COPERNICUS)
- Diuretics / Spironolactone (RALES trial)
- Digoxin (DIG Trial)
- Opioids
# Pharmacologic Management

## Functional Status

<table>
<thead>
<tr>
<th>Drug</th>
<th>NYHA 1</th>
<th>NYHA 2</th>
<th>NYHA 3</th>
<th>NYHA 4</th>
<th>Survival</th>
<th>Hospital Admits</th>
<th>Functional Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretic</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▼</td>
<td>▲</td>
</tr>
<tr>
<td>ACE-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spironolactone</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-blocker</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digoxin</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Oxford 2002
Treatment of left ventricular systolic dysfunction
- Confirm diagnosis by echocardiography or RNVG
- If possible, discontinue aggravating drugs e.g. NSAIDS, most calcium channel blockers
- Address non-pharmacological and lifestyle measures

- angiotensin converting enzyme inhibitor (1)
- beta adrenoceptor antagonist (2)

Atrial fibrillation
- Digoxin and/or
- Warfarin and/or
- Referral recommended (3)

Signs of sodium and water retention
- Modest dose of loop diuretic e.g. frusemide 40 mg/d orally

Angina
- Consider β-blocker (if not already given) (2)
- Oral nitrates and/or
- Amlopidine and/or
- Referral recommended (4)

Symptoms relieved (NYHA class I-III)
- Continue existing therapy

Persisting symptoms but no signs of sodium and water retention (NYHA class III/IV)
- Digoxin and/or
- Spironolactone (5) and/or
- Consider referral (6)

Persisting sodium and water retention
- Consider spironolactone (5) and/or
- Increase dose of loop diuretic e.g. frusemide up to 80 mg/d orally and/or
- Consider digoxin and/or
- Consider referral (6)
Issues in Palliative Care

- Perceived inability of palliative care to manage
- Perceived unwillingness of cardiology to seek help (Hanratty 2002)
- Lack of support networks and communication
- Prognostication difficult
- Resuscitation difficult issue
  - DNR written on 5% (47% in Ca, 52% in AIDS)
  - DNR wanted by patient in 23% (40% later changed minds) (Gibbs 2002)
Issues in Palliative Care

- Hospitalization only improves symptoms in 35-40% (Ward, 2002)

- Only 4% of patients dying of CHF get palliative care (40% in cancer pts) (Gibbs, 2002)

- Average performance status score of hospice admissions is 32 (range 50-10) (Zambroski, 2005)
Issues in Palliative Care

- Severe symptoms in last 48-72 hrs prior to death (SUPPORT study)
  - Breathlessness 66%
  - Pain 41%
  - Severe confusion 15%

- Regional study of Care of the Dying (RSCD) study
  - Dyspnea 50%
  - Pain 50%
  - Low mood 59%
  - Anxiety 45%

- In several studies – pysch symptoms most distressing
Okay, Mr. Collins, let's see how that old heart of yours is doing.
Symptom Oriented Palliation

Pain Management

- Pain of angina – 41-77% (metanalysis 2006)
- Pain inadequately dealt with in 90% (Gibbs 2002)
- Opioids
- Anti-anginals
- Revascularization
- TENS, Spinal cord stimulators
Symptom Oriented Palliation

- Dyspnea
  - Oxygen
  - CHF medications
  - Opioids
  - Other
Symptom Oriented Palliation

Edema
- Monitor weight regularly
- Weight loss 0.5-1kg/day
- Diuretics
- Fluid restriction
- Mild salt restriction
- Elevate lower limbs
Symptom Oriented Palliation

- Lightheadedness
  - Check for postural hypotension
  - Reassess drugs
  - Exclude arrhythmia
  - Reassure and educate
Symptom Oriented Palliation

- Muscle wasting and fatigue
  - Cachexia occurs in 50%
  - Physiotherapy
  - Exercise – if possible
  - Assess diet and energy intake
  - Review medications
Symptom Oriented Palliation

- Nausea, taste disturbance, anorexia
  - Reduced perfusion of intestines, sympathetics
  - Check chemistry (renal, liver)
  - Review meds
  - Frequent small meals
  - Supplement vitamins
  - Consider pro-motility agents
Symptom Oriented Palliation

- Depression and Anxiety
  - Regular assessment
  - Exercise program
  - Relaxation exercises
  - Antidepressants
  - Consider nocturnal opioid +/- benzodiazepine
Implantable Cardioverter Defibrillators and Pacemakers

- Leave Pacemakers intact
- Turn off/disable ICD’s
  - No discussion about turning off ICD in 73% of pts prior to last hours of life (Goldstein, 2004)
  - 8% of patients receive shocks in the minutes before death (Goldstein, 2004)
  - Plan ahead!
- Inform Funeral Home
"When I yell 'CLEAR' that doesn't mean you."
Prognostication

- Very difficult to prognosticate
- Markers of poor prognosis (< 6 months)
  - Sodium:
    - mean of 164 days if < 137, 373 days if > 137
  - Liver failure, renal failure, delirium
  - Unable to tolerate ACE-I due to bp
  - NYHA Class 4
  - EF < 20%
  - Frequent hospitalizations
  - Cachexia

<table>
<thead>
<tr>
<th>NYHA Class</th>
<th>1 Year Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>5-10%</td>
</tr>
<tr>
<td>II-III</td>
<td>15-30%</td>
</tr>
<tr>
<td>IV</td>
<td>50-60%</td>
</tr>
</tbody>
</table>
Case Study

- 90 y.o. female admitted to RGH for CHF and COPD with chest pain and dyspnea
- Hr 98, rr 28, bp 96/64
- Na 134, K 4.7, Creat 130, Urea 24
- Hgb 110
- EF 18%

Prognosis??
## CHF Risk Model

(Canadian Cardiovascular Outcomes Research Team, JAMA 2003)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory Rate (breaths/min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(minimal 20; maximal 45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure (mmHg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Urea Nitrogen (mmol/L)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium Concentration &lt; 136 mEq/L</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Dementia</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>COPD</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hepatic Cirrhosis</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cancer</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hemoglobin &lt; 100 g/L</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(not required for 30-day Score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>30-Day Score†</td>
<td>1-Year Score‡</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Age, y</td>
<td>+Age (in years)</td>
<td>+Age (in years)</td>
</tr>
<tr>
<td>Respiratory rate, min (minimal 20; maximum 45)§</td>
<td>+Rate (in breaths/min)</td>
<td>+Rate (in breaths/min)</td>
</tr>
<tr>
<td>≥180</td>
<td>−60</td>
<td>−50</td>
</tr>
<tr>
<td>160-179</td>
<td>−55</td>
<td>−45</td>
</tr>
<tr>
<td>140-159</td>
<td>−50</td>
<td>−40</td>
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<tr>
<td>120-139</td>
<td>−45</td>
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<tr>
<td>100-119</td>
<td>−40</td>
<td>−30</td>
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<tr>
<td>90-99</td>
<td>−35</td>
<td>−25</td>
</tr>
<tr>
<td>&lt;90</td>
<td>−30</td>
<td>−20</td>
</tr>
<tr>
<td>Systolic blood pressure, mm Hg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urea nitrogen (maximum, 60 mg/dL)§¶</td>
<td>+Level (in mg/dL)</td>
<td>+Level (in mg/dL)</td>
</tr>
<tr>
<td>Sodium concentration &lt;136 mEq/L</td>
<td>+10</td>
<td>+10</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>+10</td>
<td>+10</td>
</tr>
<tr>
<td>Dementia</td>
<td>+20</td>
<td>+15</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>+10</td>
<td>+10</td>
</tr>
<tr>
<td>Hepatic cirrhosis</td>
<td>+25</td>
<td>+35</td>
</tr>
<tr>
<td>Cancer</td>
<td>+15</td>
<td>+15</td>
</tr>
<tr>
<td>Hemoglobin &lt;10.0 g/dL (&lt;100 g/L)</td>
<td>NA</td>
<td>+10</td>
</tr>
</tbody>
</table>

Abbreviation: NA, not applicable to 30-day model.
*An electronic version of the risk scoring system is available at: http://www.ccort.ca/CHFriskmodel.asp.
†Calculated as age + respiratory rate + systolic blood pressure + urea nitrogen + sodium points + cerebrovascular disease points + dementia points + chronic obstructive pulmonary disease points + hepatic cirrhosis points + cancer points.
‡Calculated as age + respiratory rate + systolic blood pressure + urea nitrogen + sodium points + cerebrovascular disease points + dementia points + chronic obstructive pulmonary disease points + hepatic cirrhosis points + cancer points + hemoglobin points.
§Values higher than maximum or lower than minimum are assigned the listed maximum or minimum values.
¶Increases were protective in both mortality models. Points are subtracted for higher blood pressure measurements.
††Maximum value is equivalent to 21 mmol/L. Score calculated using value in mg/dL.
### CHF Risk Model

Our patient has a score of 127

<table>
<thead>
<tr>
<th>30-Day Score</th>
<th>30-Day Mortality Rate (%)</th>
<th>One-Year Score</th>
<th>One-Year Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 60</td>
<td>0.4</td>
<td>≤ 60</td>
<td>7.8</td>
</tr>
<tr>
<td>61-90</td>
<td>3.4</td>
<td>61-90</td>
<td>12.9</td>
</tr>
<tr>
<td>91-120</td>
<td>12.2</td>
<td>91-120</td>
<td>32.5</td>
</tr>
<tr>
<td>121-150</td>
<td>32.7</td>
<td>121-150</td>
<td>59.3</td>
</tr>
<tr>
<td>&gt;150</td>
<td>59.0</td>
<td>&gt;150</td>
<td>78.8</td>
</tr>
</tbody>
</table>
Clinical Assessment

Document ventricular function, administer medical therapy
Address symptoms, discuss prognosis, involve MDT

Progression

Reassessment

Reassess and treat exacerbating factors
Readdress symptoms, reassess goals of care
Increase involvement of MDT
Consider advanced therapeutic options

Ineligible or Declines

Hospice Care

Generally includes medical and symptom treatment
Possibly inotropic support
"Yes! That was very loud Mr. Trainer, but I said I wanted to hear your HEART!"
Summary

- CHF has a very poor prognosis
- Often need multiple medications for symptom control
- Palliative care can be of help in CHF
- Need multidisciplinary team
- Do we have the resources to palliate CHF??
References


- Murray, Scott. Dying of Lung Cancer or Cardiac Failure: Prospective Qualitative Interview Study of Patients and Their Carers in the Community. BMJ. 2002; 325:929-34

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