Prognostication & clinical decision-making in cardiac failure

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Palliative care—non cancer

- Worldwide, over 57 million people die each year: 37.9 million in developing countries, and 11 million in developed countries
- Cancer causes 10% of deaths
- Circulatory diseases cause 25%
- Chronic lung disease causes 5%
- Infectious & parasitic diseases cause 36% of deaths
Top 10 global causes of deaths, 2016

Ischaemic heart disease
Stroke
Chronic obstructive pulmonary disease
Lower respiratory infections
Alzheimer disease and other dementias
Trachea, bronchus, lung cancers
Diabetes mellitus
Road injury
Diarrhoeal diseases
Tuberculosis

Deaths (millions)

• Non-cancer patients have equal or worse symptom burdens, and psychosocial/spiritual concerns
  • Systematic Review by Moens, Higginson & Harding for EURO IMPACT, JPSM 2014

• Comparison of prevalence of 17 palliative care-related problems among adults with cancer and AIDS, CHF, ESKD, COPD, MS, MND, Parkinson’s, Dementia

• Prevalence of pain, fatigue, anorexia, dyspnoea & worry, across most of the 9 disease groups was 50% or more
Heart Failure

- Increasing prevalence
- Improved therapies = increased survival of symptomatic patients
- Limits life
  - 20% die within 1 y of diagnosis,
  - 5y mortality is 50% - worse prognosis than many cancer patients
- Profound effect on QOL & function
  - has greater negative effect on QOL than other chronic illness
- Significant cost
- Not seen as a terminal disease
  - Relevant discussions do not occur
Fig 1 The perfect storm of factors in advanced HF that converge to create a true need for palliative interventions in the care of those with advanced HF.

Lisa LeMond, Larry A. Allen

Palliative Care and Hospice in Advanced Heart Failure

Progress in Cardiovascular Diseases, Volume 54, Issue 2, 2011, 168 - 178

http://dx.doi.org/10.1016/j.pcad.2011.03.012
Prognostication problems

Cancer
- More or less predictable trajectory

Other illness
- Trajectory much less predictable
  - Difficulty in timing of referrals
Typical illness trajectories for people with progressive, chronic illness. Adapted from Lynn and Adamson 2003. With permission from RAND Corporation, Santa Monica, California, USA.
• Half of heart failure patients will die suddenly, from arrhythmia
• Half will die of progressive pump failure & multiorgan failure
Fig. 1 Schematic course of Stage C and D heart failure. Sudden death may occur at any point along the course of illness. (1) Initial symptoms of heart failure (HF) develop and HF treatment is initiated. (2) Plateaus of variable length may be reached with initial medical management or after mechanical support or heart transplant. (3) Functional status declines with variable slope, with intermittent exacerbations of HF that respond to rescue efforts. (4) Stage D HF, with refractory symptoms and limited function. (5) End of life...

Consensus statement: palliative and supportive care in advanced heart failure


http://dx.doi.org/10.1016/j.cardfail.2003.09.006
Fig 2 Intensity of care throughout the time course of the disease spectrum of HF. Palliative therapies should be integrated throughout, intensified as the patient experiences worsening HF, and escalated when the patient transitions to hospice. Important to...

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http://dx.doi.org/10.1016/j.pcad.2011.03.012
Guideline recommendations: end-stage disease

2005 American College of Cardiology & American Heart Association:

- Ongoing discussion with patients/families about prognosis for functional capacity 
  AND survival
- Advance care directives
- Palliative & hospice care
- Option to deactivate ICDs
- Symptom management including opioids
When to refer?

Evidence based recommendations

- Stage D (AAC/AHA) HF/NYHA Class III/IV
  - Significant cardiac dysfunction
  - Marked symptoms of dyspnoea, fatigue
  - Symptoms related to end-organ hypoperfusion at rest or with minimal exertion, despite maximal medical therapy
  - Recurrent hospitalisations
  - Frailty, requiring assistance with 2 or more ADLs
Palliative Care in the Treatment of Advanced Heart Failure.
Adler, Eric; Goldfinger, Judith; Kalman, Jill; Park, Michelle; Meier, Diane

DOI: 10.1161/CIRCULATIONAHA.109.869123

Figure 2. Sample algorithm for treatment of end-stage heart failure. Prognostic scores are used to help evaluate which patients with optimally treated heart failure have stage D disease. Goals of care should be established in all patients. Appropriate patients should be referred for transplant/LVAD centers for evaluation. Pain should be addressed at every visit. Palliative care consultation and/or hospice care may be considered. SHFS indicates Seattle Heart Failure Score; HFSS, Heart Failure Survival Score; BNP, brain natriuretic peptide; AICD, automated ICD; LVAD, left ventricular assist device; and Rx, therapy.
Australian national Heart failure Guidelines 2011- Also endorse Palliative Care

Strong indicators of impending mortality:

- Advanced age
- Recurrent hospitalisations- “frequent flyers”(2 hospitalisations in 1 year=high death risk within 12 months)
- NYHA symptoms
- Poor renal function
- Cardiac cachexia(weight loss >10%, albumin <25)
- Low serum Na+
- Refractory hypotension necessitating withdrawal of medical therapy
• Other risk factors for increased likelihood of death:
  - Symptomatic arrhythmia
  - Prior CPR
  - Prior syncope
  - Embolic stroke
Prognostication Tools

What is the best *prognostic indicator* to use?

- No studies *comparing* accuracy of different tools
- Validation studies of various instruments
The “Surprise” question-Joanne Lynn

- “Would you be surprised if this patient were to die in the next 6-12 months?”

- Prompt for working to improve patients’ QOL, NOW
- Can be applied to years/months/weeks/days
If you would not be surprised if a patient were to die in the next one-two years, that patient has a serious, life-limiting illness and would likely benefit from serious discussion and planning relative to end-of-life care.

Clinicians should not limit palliative care integration into care of CHF patients.
CHF specific Prognostic tools & models

• **Large body of evidence**
  - Cardiology literature (c.f. Adler, Meier et al, *Circulation*, 2009)
  - Cardiac Specialty Guidelines (e.g. AHA, *Circulation*, 2013-300 pages)

• **Single-item**

  - e.g.
    - 6 minute walk test
    - *Maximal oxygen consumption*-gold standard
    - B-type natriuretic peptide
    - Creatinine
Complex multivariable models - many

Recommendation:
Seattle Heart Failure Score

- Multiple variables, including adjustment for specific pharmacologic & device-based therapies
- Well-validated in large patient population
- BUT
  - 24 variables-administration difficulties
Symptom management
CHF
Cyanosis
Raised JVP
Organ congestion
Ascites
Dependent oedema

MARKED DILATATION OF RIGHT VENTRICLE DUE TO MITRAL VALVULAR DISEASE RESULTING IN RIGHT HEART FAILURE
Figure 2 Schematic Etiology of Heart Failure Symptoms Figure illustration by Rob Flewell. RAAS = renin-angiotensin-aldosterone system; TNF = tumor necrosis factor.

Sarah J. Goodlin
**Palliative Care in Congestive Heart Failure**

Journal of the American College of Cardiology, Volume 54, Issue 5, 2009, 386 - 396

http://dx.doi.org/10.1016/j.jacc.2009.02.078
Intractable Angina Management
Dyspnoea Management
Renal Failure Management

Implantable Cardioverter Defibrillator (ICD) Considerations
Evidence base: Management of symptoms

- Continue “usual” medical management, to address neuro-humoral axis:
  - ACE-Inhibitors (intolerance due to hypotension = poor outcome)
  - Beta blockers
  - Spironolactone

- CPAP warranted at all phases of care
- Inotropes
  - Symptomatic relief
  - Not home-based in most Services in Australia
  - Increased mortality
Device therapy

- **ICDs**
  - 10 000 per month in U.S.
  - Reduce risk of sudden death by treating arrhythmias
  - Do not improve symptoms
  - As failure worsens, shocks may increase pain & anxiety
  - **Advance plan mandatory!**

- **Cardiac resynchronisation therapy**
  - Shown to improve QOL
  - No need to turn off biventricular pacing
• **LVADs**
  - 2680 in 2006-2010 in U.S.
  - 2200 annually up to 2015
  - 82% as *bridge to transplant*; 11%= “destination therapy”
  - REMATCH Trial-improved QOL & survival vs inotropes
  - Improve exercise tolerance, normalise haemodynamics, improve end-organ function, emotional well-being
  - **Risks**-bleeding, infection, stroke(3-12%)

• Challenges at EOL-may stop suddenly
• Discontinuation can cause death rapidly
  - Within 20 minutes
• May continue to function during dying phase
Advance plan mandatory!
Many with BTT plan become DT (31% receive transplant)

- Recommendation that palliative care should be incorporated into the comprehensive care of LVAD destination therapy patients
- Implementation unclear
- Evidence from single-centre trial, that family awareness of patient’s wishes around limitation of treatment leads to deactivation of LVAD-Nakagawa et al, *J Palliat Med* 20,9;2017
Symptom management
Table 4.
Common Heart Failure Symptoms and Palliative Treatment Options

<table>
<thead>
<tr>
<th>Symptom</th>
<th>I</th>
<th>IIA</th>
<th>IIIB</th>
<th>III</th>
<th>Insufficient</th>
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<tbody>
<tr>
<td>Dyspnea</td>
<td>Loop diuretics with or without thiazides</td>
<td>Inotropes&lt;sup&gt;64&lt;/sup&gt;</td>
<td>Oxygen (without hypoxia)&lt;sup&gt;69&lt;/sup&gt;</td>
<td>Benzodiazepines&lt;sup&gt;70&lt;/sup&gt;</td>
<td>Acupuncture/ cupressure&lt;sup&gt;63&lt;/sup&gt;</td>
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<td></td>
<td>Nitrates&lt;sup&gt;61&lt;/sup&gt;</td>
<td>Aquapheresis (if diuretic resistance)&lt;sup&gt;65&lt;/sup&gt;</td>
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<td></td>
<td>Low-dose opioids&lt;sup&gt;82,83&lt;/sup&gt;</td>
<td>Walking aids&lt;sup&gt;96&lt;/sup&gt;</td>
<td>Breathing training&lt;sup&gt;86&lt;/sup&gt;</td>
<td>Exercise training&lt;sup&gt;76&lt;/sup&gt;</td>
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<td></td>
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<td></td>
<td></td>
<td>Hawthorn extract&lt;sup&gt;89&lt;/sup&gt;</td>
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<tr>
<td>Pain</td>
<td>Opioids&lt;sup&gt;71&lt;/sup&gt;</td>
<td>Acupuncture&lt;sup&gt;73&lt;/sup&gt;</td>
<td>Nonsteroidal antiinflammatory drugs&lt;sup&gt;57&lt;/sup&gt;</td>
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<tr>
<td>Bone pain: bisphosphonates&lt;sup&gt;75&lt;/sup&gt;</td>
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<tr>
<td>Anginal pain: nitrates, β-blockers, calcium channel blockers, ranolazine, coronary revascularization&lt;sup&gt;79&lt;/sup&gt;</td>
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<tr>
<td>Depression</td>
<td>Selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors, tricyclic antidepressants&lt;sup&gt;78&lt;/sup&gt;</td>
<td>Psychological interventions: cognitive behavioral therapy, counseling, or supportive therapy&lt;sup&gt;77&lt;/sup&gt;</td>
<td></td>
<td>Exercise&lt;sup&gt;78&lt;/sup&gt;</td>
<td></td>
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<tr>
<td>Fatigue</td>
<td>Treat secondary causes (anemia, infection, sleep apnea, etc)&lt;sup&gt;93-97&lt;/sup&gt;</td>
<td></td>
<td>Increased rest and reduction of physical activity&lt;sup&gt;81&lt;/sup&gt;</td>
<td></td>
<td>Anti-inflammatory agents&lt;sup&gt;81&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Stimulants&lt;sup&gt;80,81&lt;/sup&gt;</td>
<td>Exercise training&lt;sup&gt;81&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>Nutritional supplements or appetite stimulants&lt;sup&gt;81&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Based on authors’ recommendations, not established specific guidelines.

Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.
Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.
Class IIa: the weight of evidence or opinion is in favor of the procedure or treatment.
Class IIb: usefulness/efficacy is less well established by evidence or opinion.
Class III: Conditions for which there is evidence and/or general agreement that the procedure or treatment is not useful/effective and in some cases may be harmful.
Insufficient: Insufficient evidence to make recommendation.
Palliation

Palliation of symptoms refractory to treatment of underlying causes

- Evidence based
- Level 1
Dyspnoea, oedema - volume overload

- Loop diuretics
- Monitor weight
- Dietary Na+ restriction
- Nitrates
- Opioids
- Benzodiazepines (Level 2)
- Inotropes - risk of sudden cardiac death
- NO Role for oxygen in non-hypoxic patients
Palliative therapies should be added in a stepwise fashion to traditional therapies and optical medical management of HF.

Adapted from Rocker et al.³³Lisa LeMond, Larry A. Allen *Palliative Care and Hospice in Advanced Heart Failure* Progress in Cardiovascular Diseases, Volume 54, Issue 2, 2011, 168 - 178
Is the patient on maximal antianginal therapy? Consider:
Aspirin, Clopidogrel
Beta-blockers (if heart failure allows)
Nitrates—long acting
Calcium channel blockers
dihydropyridine
Nicorandil
Perhexilene—use with care including therapeutic drug monitoring LFT and BSL
Pain

For the management of intractable angina consider:

- Opioids
- Home oxygen
- Bone pain-bisphosphonates
Depression & anxiety

- 21-36% of patients
- Affects caregivers as well

- SSRIs
- SNRIss
- TCAs—caution re arrhythmias, QT prolongation
Evidence base

- **Level 2**
Fatigue

- May be a symptom of decompensated heart failure without “classic” dyspnoea
- Treat secondary contributors (anaemia, infection, sleep apnoea etc)
- Exercise training
- Energy conservation
- ?Stimulants
Communication & decision-making

- **Must occur early!**

- American & Australian Guidelines include recommendations for
  - Ongoing discussion with patients & families about prognosis incl. functional capacity & survival
  - Advance directives
  - Palliative care
  - *Option to deactivate ICDs*
  - Provision of symptomatic management incl. opioids
Challenges

- Meeting the often unrealistic expectations of patients & families with regard to what modern medicine can really offer
Barriers

- Doctors uncomfortable & do not discuss EOL issues
  - **Including role of device therapies**
    - Patients may not fully understand
    - Survey 2009 Kelley AS et al *Am Heart J*-n.o.k.report only 1 in 4 discussed deactivation
- Patients have not told Physician & family of their wishes
- Patients & families have fears & misperceptions about Palliative Care & EOLC
Challenges

- Failure of medical profession to engage in end of life care debate and realistic assessment of goals of medicine.

- In patients with end-stage heart failure the two most common modes of death are worsening heart failure with fluid overload and **sudden cardiac Death**.
ICD considerations

Recurrent ICD shocks may not add to the quality of life of these patients but instead cause undue distress to the patient and their carers. The shocks from the ICD can cause physical suffering and anxiety.
• Patients & families do not have clear understanding of prognosis if this is not discussed by doctors

• SUPPORT Study tells us that patients are likely to choose treatments based on their understanding of their prognosis
  ○ SUPPORT Study, JAMA, 1995
  ○ (Study to Understand Prognosis & Preferences for Outcomes & Risks of Treatment)
  ○ Aim: To improve end of life decision-making & reduce frequency of a mechanically supported, painful & prolonged process of dying
• Prognostication is difficult!
  ○ Changing therapies related to emerging clinical trial evidence e.g. VAD, may alter original prognosis
"This idea that there’s a bright line between disease treatment and palliative treatment is an illusion."

*Diane Meier, director, Center to Advance Palliative Care*
• Don’t wait for some specific “transition point”, where patient changes from “active” to “palliative” care—death may come suddenly without warning
• Have conversations *early*
• Re-visit often
  - At each clinical review
  - At each hospital admission
The way forward....

Collaborative care models

- Improved survival of patients
  - Temel et al - Lung cancer NEJM 2010
- Patients receiving hospice vs not, had increased survival of 81 days
  - Due to avoidance of hospitalisations, with procedures, infection risk
  - hospice interventions - excellent symptom management, caregiver respite
Palliative Care interventions

- Systemic review & meta-analysis, Diop et al, *J Palliat Med* 20,1;2017;15 Studies
- Majority of studies measuring patient-centred outcomes showed improvements – QOL 83%, satisfaction 67%
  - Improved dyspnoea, sleep quality, depression & anxiety
- Quality of death outcomes:
  - Improved clarification of care preferences (DNR etc)
  - Less improvement in home death, hospice enrolment
St George Hospital Sydney experience

- Integrated collaborative Palliative Care in Heart failure
- Co-management of CHF patients by Heart Failure Service & Palliative Care & GPs
- Difficulties with timing of transition to palliative care
- Resource scarcity
• Understanding dying experience led to looking back in illness trajectory-timing of PS referral
• Integration of palliative care into the existing comprehensive community-based HF programme
• Up-skilling /support of Cardiology Nursing staff

**Evaluation:**
- 121 consecutive deaths evaluated over 3 years
- Only 8.3% of patients required Specialist PC Team involvement
- 50% died at home, 20% died in RACFs
- Reduction of E.D. presentations
Conclusion

- Heart-failure is a **life-limiting disease**
  - High risk sudden death
  - Poor prognosis
- High symptom burden
- Need for improved communication
  - Realistic prognostication
Palliative Care involvement & integration has proven benefits

- Symptom control, QOL
- Cost benefits
- Advance care planning