Management of CAD in Low-EF Patients
DISCLOSURES

• NONE
Management of CAD in Low-EF Patients

Jacob DeLaRosa, MD
Portneuf Medical Center, Idaho State University
Pocatello, Idaho USA

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Management of CAD in Low-EF Patients
# Management of CAD in Low-EF Patients

<table>
<thead>
<tr>
<th>Ejection Fraction (EF) %</th>
<th>Pumping Ability of the Heart</th>
<th>Level of Heart Failure/Effect on Pumping</th>
</tr>
</thead>
<tbody>
<tr>
<td>55% to 70%</td>
<td>Normal</td>
<td>Heart function may be normal or ou may have heart failure with preserved EF (HF-pEF)</td>
</tr>
<tr>
<td>40% to 54%</td>
<td>Slightly below normal</td>
<td>Less blood is available so less blood is ejected from the ventricles. There is a lower-than-normal amount of oxygen-rich blood available to the rest of the body. You may not have symptoms.</td>
</tr>
<tr>
<td>35% to 39%</td>
<td>Moderately below normal</td>
<td>Mild heart failure with reduced EF (HF-rEF)</td>
</tr>
<tr>
<td>&lt;35%</td>
<td>Severely below normal</td>
<td>Moderate-to-severe HF-rEF. Severe HF-rEF increases risk of life-threatening heartbeats and cardiac dysynchrony/desynchronization (right and left ventricles do not pump in unison)</td>
</tr>
</tbody>
</table>
Management of CAD in Low-EF Patients

• Corrective Therapy
  • Medical Therapy
  • Device Therapy
  • Surgery

• Irreversible loss of myocardium
  • Transplant
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• Medical Therapy
  • ACE inhibitor
  • Beta Blocker
  • Statin
  • Aspirin
  • Diuretics
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• Device Therapy
  • ICD
    • Prevention of sudden cardiac death
  • CRT
    • Cardiac dyssynchrony
    • Prolonged QRS duration (≥120msec)
    • NYHA class II, III, or IV
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- Surgery
  - Historical perspective
    - Mortality rates >50%
    - “Prohibitive risk”
    - “Inoperable”
    - Large multicenter trials excluded patients with (EF <40%)

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- Reversible loss of contractility
  - Hibernating myocardium
    - Down-regulated myocardial contractility
    - Long-standing partial reduction in blood flow
    - Potential to recover after revascularization

Rahimtoola. Am Heart J 1989;117:211-21
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• Reversible loss of contractility
  • Stunned myocardium
    • A state of a prolonged regional wall motion abnormality
    • Occurs after an episode of sublethal ischemia

Braunwald E. Circulation 1982; 66:1146
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- Surgery
  - Columbia University
    - 1997-1999
      - 55,515 patients
  - CABG

### Groups Ejection Fraction

<table>
<thead>
<tr>
<th>Groups</th>
<th>Ejection Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>≤ 20%</td>
</tr>
<tr>
<td>II</td>
<td>21-30%</td>
</tr>
<tr>
<td>III</td>
<td>31-40%</td>
</tr>
<tr>
<td>IV</td>
<td>&gt;40%</td>
</tr>
</tbody>
</table>

*Conclusions*- Patients with low EF are sicker at baseline and have >4 times higher mortality than patients with high EF.

Management of CAD in Low-EF Patients

- Surgery
  - 1981-2006
  - 26-studies, (4,119 patients)
  - CABG
  - Low EF ≤ 35%

Conclusion: The present meta-analysis demonstrates that based on data from available observational clinical studies, CABG can be performed with acceptable operative mortality and 5-year actuarial survival in patients with severe LV dysfunction.

- Operative mortality: 5.4%
- 5-year survival: 73.4%
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- Surgery
  - The STICH TRIAL
    - Randomized controlled trial
      - Ischemic left ventricular dysfunction, (Low EF)
      - CAD amenable to surgical revascularization
    - COMPARED
      - CABG + MEDS vs. MEDS

Carson P. JACC Heart Fail. 2013 Oct; 1(5): 10.1016
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**Primary Endpoint**
- All-cause mortality

**Major Secondary Endpoints**
- Cardiovascular mortality
- Death (all-cause) + cardiovascular hospitalization
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All Cause Mortality

HR 0.86 (0.72, 1.04)  
P = 0.123

Adjusted HR 0.82 (0.68, 0.99)  
Adjusted P = 0.039

0.46
0.41
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Cardiovascular Mortality

HR 0.81 (0.66, 1.00)
P = 0.050
Adjusted HR 0.77 (0.62, 0.94)
Adjusted P = 0.012
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Death or Cardiovascular Hospitalization

HR 0.74 (0.64, 0.85)
P < 0.001

Adjusted HR 0.70 (0.61, 0.81)
P < 0.001
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Time-varying Hazard Ratios

<table>
<thead>
<tr>
<th>Time Periods</th>
<th>Hazard Ratio (95% CI)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 30 days</td>
<td>3.12 (1.33, 7.31)</td>
<td>0.009</td>
</tr>
<tr>
<td>31–365 days</td>
<td>0.90 (0.63, 1.29)</td>
<td>0.568</td>
</tr>
<tr>
<td>366 days–2 years</td>
<td>1.00 (0.66, 1.52)</td>
<td>0.982</td>
</tr>
<tr>
<td>≥ 2 years</td>
<td>0.68 (0.52, 0.89)</td>
<td>0.004</td>
</tr>
</tbody>
</table>
Conclusions

- There was no statistically significant difference in all-cause mortality between medical therapy alone and CABG.

- When randomized to CABG patients are exposed to an early risk.
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• STICHES

10-Year Outcomes, CABG Group vs Medical Therapy

<table>
<thead>
<tr>
<th>Outcome</th>
<th>CABG group (%)</th>
<th>Medical-therapy group (%)</th>
<th>HR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death from any cause</td>
<td>58.9</td>
<td>66.1</td>
<td>0.84 (0.73–0.97)</td>
<td>0.02</td>
</tr>
<tr>
<td>Death from cardiovascular causes</td>
<td>40.5</td>
<td>49.3</td>
<td>0.79 (0.66–0.93)</td>
<td>0.006</td>
</tr>
<tr>
<td>Death from any cause or hospitalization for heart failure</td>
<td>76.6</td>
<td>87.0</td>
<td>0.72 (0.64–0.82)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

CONCLUSIONS

In a cohort of patients with ischemic cardiomyopathy, the rates of death from any cause, death from cardiovascular causes, and death from any cause or hospitalization for cardiovascular causes were significantly lower over 10 years among patients who underwent CABG in addition to receiving medical therapy than among those who received medical therapy alone. (Supported by the National Institutes of Health; STICH [and STICHES] ClinicalTrials.gov number, NCT00023595.)
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• Summary

• Revascularization can improve outcomes in patients with a reduced ejection fraction

• In patients with CAD and a low-EF CABG should be strongly considered, to improve long-term survival
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