10-Year Mortality of Older Acute Myocardial Infarction Patients Treated in U.S. Community Practice

Ajar Kochar, MD

on behalf of:
Anita Y. Chen, Puza P. Sharma, Neha J. Pagidipati, Gregg C. Fonarow, Patricia A. Cowper, Eric D. Peterson, Tracy Y. Wang
Disclosures

- The presenting author has no relevant conflict of interests to disclose
- This project was funded by a research grant to the Duke Clinical Research Institute from Novartis
Background

- The American population is aging
  - % ≥65 years in 2000: 12%
  - % ≥65 years in 2030: 20% (71 million)

- Older individuals are disproportionally affected by ischemic heart disease
  - half of contemporary MI patients are > 65 years

- Little is known about long-term (10-year) survival of older MI patients treated in routine clinical practice
Objective

- To describe 10-year mortality among MI patients $\geq 65$ years

- To evaluate 10-year mortality among MI patients
  - stratified by age, MI type, and re-vascularization approach
  - who survived the first year post-index event
Methods

- CRUSADE is a national registry of acute coronary syndrome patients in the U.S. started in 2001
  - STEMI added in 2004 among a subset of hospitals
- Linkage of patients ≥ 65 years to Medicare data through 2014 permitted long-term mortality assessment

Study Population:
- STEMI and NSTEMI patients ≥ 65 treated at 344 hospitals between 2004 - 2006

Primary endpoint:
- all-cause mortality
Statistical Analysis

- Cumulative incidence curves examined mortality from date of index MI admission
  - Secondary landmark analysis examined mortality among patients who survived the first year post MI
- Mortality rates examined by
  - Age
  - MI type (STEMI vs. NSTEMI)
  - Revascularization status (PCI vs. CABG vs. neither)
- Multivariable Cox proportional hazard modeling to adjust for patient characteristic differences*

## Baseline Characteristics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Overall (n = 22,295)</th>
<th>NSTEMI (n = 19,755)</th>
<th>STEMI (n = 2,540)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>77 (71, 83)</td>
<td>78 (72, 84)</td>
<td>76 (70, 82)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>47.5</td>
<td>47.9</td>
<td>44.9</td>
</tr>
<tr>
<td>White Race (%)</td>
<td>86.7</td>
<td>86.4</td>
<td>89.1</td>
</tr>
<tr>
<td>Medical History</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>76.6</td>
<td>77.6</td>
<td>68.4</td>
</tr>
<tr>
<td>Dyslipidemia (%)</td>
<td>53.7</td>
<td>54.4</td>
<td>47.7</td>
</tr>
<tr>
<td>Prior CAD (%)</td>
<td>45.0</td>
<td>46.8</td>
<td>30.6</td>
</tr>
<tr>
<td>Diabetes mellitus (%)</td>
<td>34.9</td>
<td>36.0</td>
<td>26.3</td>
</tr>
<tr>
<td>Prior HF (%)</td>
<td>21.1</td>
<td>22.5</td>
<td>9.6</td>
</tr>
<tr>
<td>Renal Insufficiency (%)</td>
<td>17.1</td>
<td>18.0</td>
<td>9.9</td>
</tr>
</tbody>
</table>
## Treatment Strategies and Discharge Medications

<table>
<thead>
<tr>
<th>Revascularization Status</th>
<th>Overall (n = 22,295)</th>
<th>NSTEMI (n = 19,755)</th>
<th>STEMI (n = 2,540)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI (%)</td>
<td>36.1</td>
<td>32.3</td>
<td>65.5</td>
</tr>
<tr>
<td>CABG (%)</td>
<td>8.6</td>
<td>8.7</td>
<td>8.0</td>
</tr>
<tr>
<td>Neither (%)</td>
<td>54.1</td>
<td>57.7</td>
<td>25.9</td>
</tr>
</tbody>
</table>

## Discharge Medication

<table>
<thead>
<tr>
<th>Discharge Medication</th>
<th>Overall (n = 22,295)</th>
<th>NSTEMI (n = 19,755)</th>
<th>STEMI (n = 2,540)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin (%)</td>
<td>95.3</td>
<td>95.0</td>
<td>97.5</td>
</tr>
<tr>
<td>Beta blocker (%)</td>
<td>93.9</td>
<td>93.7</td>
<td>95.2</td>
</tr>
<tr>
<td>Statin (%)</td>
<td>81.3</td>
<td>80.3</td>
<td>88.4</td>
</tr>
<tr>
<td>Clopidogrel (%)</td>
<td>72.9</td>
<td>71.0</td>
<td>86.7</td>
</tr>
</tbody>
</table>
Cumulative Incidence of Mortality

Median survival:
4.8 years (1.1, 8.5)

1 year: 24%
5 years: 51%
10 years: 72%
Median Survival Stratified by Age

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Median Survival in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-69</td>
<td>8.3</td>
</tr>
<tr>
<td>70-74</td>
<td>7.8</td>
</tr>
<tr>
<td>75-79</td>
<td>5.3</td>
</tr>
<tr>
<td>80-85</td>
<td>3.5</td>
</tr>
<tr>
<td>85-89</td>
<td>2</td>
</tr>
<tr>
<td>≥90</td>
<td>1</td>
</tr>
</tbody>
</table>
1-Year Landmark Analysis

![Graph showing mortality over time since index MI]

- **1-year mortality**: 24%
- **10-year mortality**: 72%
- **Overall Population**: Mortality increases steadily over time.
- **Landmark Population**: Shows a faster increase in mortality compared to the overall population.

**Key Points**:
- Time Since Index MI (Years)
- Mortality (%)

*Source: Duke Clinical Research Institute*
10-Year Mortality by Revascularization Status

- Neither: 84%
- PCI: 57%
- CABG: 57%

Mortality (%) vs. Time Since Index MI (Years)
Limitations

- Voluntary hospital participation in CRUSADE with fewer hospitals contributing STEMI patients
- Medicare data precluded comparison to outcomes of younger aged patients
- Observational data with unmeasured confounding during comparisons
- Cause of death was not ascertained
Conclusions

- MI patients ≥ 65 years old have very high 10-year mortality
  - despite high prevalence of evidence-based medications prescribed at discharge

- Mortality remains high, even among patients
  - aged 65-74 years
  - underwent in-hospital revascularization
  - survived first year post-index event
Results in Context

- In 2015, expected additional lifespan of a 65-year old is 19 years
  - In our cohort, median survival of MI patients aged 65-69 was 8.3 years
  - Mortality uptrends early after the index MI event and continues to increase by 6-7% per year after the 1st year

- Changes in treatment in the last decade:
  - Revascularization of NSTEMI patients ≥ 65

<table>
<thead>
<tr>
<th></th>
<th>2004-2006</th>
<th>2011-2012*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI</td>
<td>32%</td>
<td>36%</td>
</tr>
<tr>
<td>CABG</td>
<td>8%</td>
<td>8%</td>
</tr>
</tbody>
</table>

*Fanaroff, JAMA Cardiol 2017; 2 (36)
Implications

- Long-term mortality data for older MI patients informs medical decision-making for both patients and clinicians.

- Our results demonstrate an unmet need in addressing long-term outcomes in older MI patients.

- Potential strategies to tackle high mortality rates:
  - Improve percutaneous revascularization options
  - Improve adherence to evidence-based medications
  - Assess the role of novel approaches
Thank you

- Anita Y. Chen, MS
- Puza P. Sharma, MBBS, MPH, PhD
- Neha J. Pagidipati, MD, MPH
- Gregg C. Fonarow, MD
- Patricia A. Cowper, PhD
- Eric D. Peterson, MD, MPH
- Tracy Y. Wang, MD, MHS, MSc
<table>
<thead>
<tr>
<th>MI Type</th>
<th>Unadjusted Event Rate</th>
<th>Unadjusted p value</th>
<th>Adjusted HR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEMI</td>
<td>59.8 (57.5-62.1)</td>
<td>&lt;0.0001</td>
<td>0.93 (0.87-0.99)</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>73.3 (72.0-74.6)</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>PCI</td>
<td>56.8 (55.5-58.2)</td>
<td>&lt;0.0001</td>
<td>0.65 (0.62-0.68)</td>
</tr>
<tr>
<td>CABG</td>
<td>56.9 (50.2-63.8)</td>
<td>0.61 (0.57-0.66)</td>
<td>Reference</td>
</tr>
<tr>
<td>Medical Management</td>
<td>84.0 (82.3-85.7)</td>
<td></td>
<td>Reference</td>
</tr>
</tbody>
</table>