Soroka Acute Myocardial Infarction (SAMI) score predicting 10-year mortality following acute myocardial infarction (AMI)

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No conflict of interest
Background

• As short-term survival from AMI improves, better understanding of the long-term natural history and risk stratification becomes more important

Soroka Acute Myocardial Infarction (SAMI) Score

• Simple assessment tool
• Validated for predicting 1- and 5-year mortality
• Based on “real life” available clinical information
• Including variety of cardiovascular and non-cardiovascular co-morbidities

Aim: to evaluate the validity of the SAMI score for a long-term (ten years) follow-up


Contents lists available at ScienceDirect
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A new risk score predicting 1- and 5-year mortality following acute myocardial infarction
Soroka Acute Myocardial Infarction (SAMI) Project

Ygal Plakht a,b,*, Arthur Shiyovich c, Shimon Weitzman d, Drora Fraser d, Doron Zahger c, Harel Gilutz c
Methods

• **Study population:**
  2772 AMI patients discharged from Soroka Medical Center during 2002-2004

• **Data collection:**
  demographic and clinical data obtained from the hospital's information systems.

• **Follow-up:**
  up to 10.5 years (median 8.1 years)

• **End point:**
  all-cause mortality
## Results

10-years cumulative mortality = 51.4%

<table>
<thead>
<tr>
<th>Variable</th>
<th>Original weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years ⋅ 65-75</td>
<td>2</td>
</tr>
<tr>
<td>⋅ &gt;75</td>
<td>4</td>
</tr>
<tr>
<td>Echocardiography study findings ⋅ Abnormal</td>
<td>4</td>
</tr>
<tr>
<td>⋅ Missing</td>
<td>2</td>
</tr>
<tr>
<td>Plasma sodium, ⋅ &lt;135 mEq/L</td>
<td>2</td>
</tr>
<tr>
<td>Intervention for AMI ⋅ CABG</td>
<td>-6</td>
</tr>
<tr>
<td>⋅ Thrombolytic /PCI</td>
<td>-3</td>
</tr>
<tr>
<td>Groups of diseases</td>
<td></td>
</tr>
<tr>
<td>⋅ Renal Diseases</td>
<td>2</td>
</tr>
<tr>
<td>⋅ Anemia</td>
<td>2</td>
</tr>
<tr>
<td>⋅ Obesity</td>
<td>-2</td>
</tr>
<tr>
<td>⋅ Other non-cardiovascular co-morbidities</td>
<td>3</td>
</tr>
</tbody>
</table>
Results

Cumulative mortality (%) during the follow-up period according to the adjusted SAMI index score categories

ROC = 0.942
Conclusions

- The study expands the applicability of the SAMI risk score for long-term risk stratification

- It extends and updates current information on determinants of long-term prognosis following an AMI

- The SAMI score parameters that were generated for a relatively short-term prognosis were proven to be valid and accurate for a long-term period
### Study Population

#### Demographic Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years (Mean; SD)</td>
<td>66±13.5</td>
</tr>
<tr>
<td>Gender Male</td>
<td>69%</td>
</tr>
</tbody>
</table>

#### Administrative Characteristics of Hospitalization

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of hospitalization, days (Mean; SD)</td>
<td>9.7±7</td>
</tr>
<tr>
<td>Treated in ICCU</td>
<td>68%</td>
</tr>
</tbody>
</table>
## Study Population

### Performance of Diagnostic Procedures %

<table>
<thead>
<tr>
<th>Procedure</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echocardiography</td>
<td>75</td>
</tr>
<tr>
<td>Angiography</td>
<td>61</td>
</tr>
</tbody>
</table>

### Intervention

<table>
<thead>
<tr>
<th>Procedure</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG (%)</td>
<td>8.2</td>
</tr>
<tr>
<td>Other Reperfusion (%)</td>
<td>43</td>
</tr>
</tbody>
</table>
## Study Population

### Groups of Discharge Codes

<table>
<thead>
<tr>
<th>Condition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperlypidemia</td>
<td>59</td>
</tr>
<tr>
<td>Hypertension</td>
<td>52</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>40</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>36</td>
</tr>
<tr>
<td>Obesity</td>
<td>20</td>
</tr>
<tr>
<td>Anemia</td>
<td>20</td>
</tr>
<tr>
<td>Old MI</td>
<td>19</td>
</tr>
<tr>
<td>Renal diseases</td>
<td>19</td>
</tr>
</tbody>
</table>
## Index Scale - Parameters and Weights

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>65-75 years / 75+ years</td>
<td>1 / 3</td>
</tr>
<tr>
<td><strong>During Hospitalization:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Blood Tests</strong></td>
<td></td>
</tr>
<tr>
<td>Hyponatremia</td>
<td>1</td>
</tr>
<tr>
<td>Hyperkalemia</td>
<td>1</td>
</tr>
<tr>
<td>Left Ventricular Dysfunction (Severe)</td>
<td>2</td>
</tr>
<tr>
<td>Left Ventricular Hypertrophy (Concentric or Significant)</td>
<td>2</td>
</tr>
<tr>
<td>Mitral Regurgitation (Moderate or Severe)</td>
<td>3</td>
</tr>
<tr>
<td>Pulmonary Hypertension (Moderate or Severe)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Echocardiography</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
<td></td>
</tr>
<tr>
<td>CABG / Other Reperfusion</td>
<td>-4 / -2</td>
</tr>
</tbody>
</table>

*If echocardiography wasn't performed, add 1 Point and ignore these parameters:*
# Index Scale - Parameters and Weights

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>At discharge: Groups of Diseases</strong></td>
<td></td>
</tr>
<tr>
<td>Old Myocardial Infarction</td>
<td>1</td>
</tr>
<tr>
<td>Renal Diseases</td>
<td>1</td>
</tr>
<tr>
<td>Obesity</td>
<td>-1</td>
</tr>
<tr>
<td><strong>Gastro-Intestinal Bleeding</strong></td>
<td>3</td>
</tr>
<tr>
<td>Anemia</td>
<td>1</td>
</tr>
<tr>
<td>COPD</td>
<td>2</td>
</tr>
<tr>
<td><strong>Malignant Neoplasm</strong></td>
<td>3</td>
</tr>
<tr>
<td>Alcohol or/and Drug Addiction</td>
<td>3</td>
</tr>
<tr>
<td>Neurological Disorders</td>
<td>3</td>
</tr>
<tr>
<td>Schizophrenia or Psychosis</td>
<td>3</td>
</tr>
</tbody>
</table>
Calibration

For each rise of one point, the mortality increased by:

- 1 year follow-up: 1.39 (95% CI: 1.33-1.45) – training set
  1.31 (95% CI: 1.24-1.38) – validation set
- 5 years follow-up: 1.41 (95% CI: 1.37-1.45)
- 10 years follow-up: 1.25 (95% CI: 1.23-1.26) – original score
  1.32 (95% CI: 1.30-1.34) – adapted score

p<0.001 for each
Discrimination - Area Under the ROC Curve

- 1 year follow-up: 0.866 - training set
  0.839 - validation set
- 5 years follow-up: 0.858
- 10 years follow-up: 0.833 - original score
  0.942 - adapted score

The c-statistic is high compared with other risk models that ranged between 0.65 and 0.81

Antman et al., 2000; Eagle et al., 2004; Tu et al, 2001; Normand et al., 1995