Comparison of the Society of Thoracic Surgeons Predicted Risk of Mortality, Logistic EuroScore I and EuroScore II in Israeli Patients Undergoing Cardiac Surgery

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Background

- The Israeli Society of Cardiothoracic Surgery and the Ministry of Health recently established the 1st national-level adult cardiac surgery database linked to the STS ACSD.
Background

- Accurate and fair measurement of performance must be based on Risk-Adjustment

- STS ACSD risk-prediction models
  - Huge amount of data
  - Sophisticated algorithms
Background

• Fundamental social, economic and cultural differences
• Markedly different healthcare systems, infrastructure, patient profiles, referral and practice patterns between US and Israel
Background

• STS ACSD risk-prediction models in Israeli patients
  • Applicability?
  • Validity?
Aim of the Study

• Compare the accuracy of the STS PROM, the Logistic EuroScore I and EuroScore II in Israeli patients undergoing cardiac surgery
Methods

• Study cohort – 1279 patients who underwent cardiac operation with a calculable STS PROM
• Departmental STS-linked database was used to calculate the STS PROM, EuS I and EuS II
• Overall Observed vs. Expected mortality (O/E Ratio) and across 5 risk-score sub-groups
• Model discrimination - ROC curves with AUC
• Correlation among the 3 scores
# Observed vs. Expected Mortality

<table>
<thead>
<tr>
<th>Score</th>
<th>Observed Mortality</th>
<th>Expected Mortality</th>
<th>O / E Ratio</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS PROM</td>
<td>1.95%</td>
<td>3.12%</td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td>EuS II</td>
<td>1.95%</td>
<td>3.31%</td>
<td>0.59</td>
<td>0.36</td>
</tr>
<tr>
<td>L EUS I</td>
<td>1.95%</td>
<td>7.97%</td>
<td>0.24</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

* Versus STS PROM
Correlation Among the Scores

Red - STS vs. Logistic EuroScore I
Blue – STS vs. EuroScore II

R=0.67; p=0.0001

R=0.74; p=0.0001
Observed vs. Expected Mortality Ratio

<table>
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<tr>
<th>P Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>STS vs. Euroscore II</td>
<td>0.36</td>
</tr>
<tr>
<td>STS vs. Logistic EuroScore I</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
Model Discrimination
Receiver Operating Curves and Area Under the Curve (AUC)

<table>
<thead>
<tr>
<th>Model</th>
<th>AUC</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>STSM</td>
<td>0.825</td>
<td>0.737 - 0.919</td>
</tr>
<tr>
<td>EuroScore II</td>
<td>0.811</td>
<td>0.726 - 0.897</td>
</tr>
<tr>
<td>Logistic EuroScore I</td>
<td>0.810</td>
<td>0.725 - 0.896</td>
</tr>
</tbody>
</table>

P=0.89
Conclusions

• The STS PROM and EuS II performed equally well
• EuS I overestimated mortality
• Further studies in much larger cohorts are necessary to validate the entire spectrum of the STS risk-prediction models of procedural outcomes

The Observed vs STS PROM Ratio is an accurate quality metric in Israeli patients undergoing cardiac surgery
Thank You