MELD scores in liver transplant recipients

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Introduction

• Within the first year after liver transplantation (LTx) 10-15 % die [1].

• Early warning indicators of poor outcome is lacking. Identification could facilitate improved management and identification of processes leading to poor outcome.

• The Model of End-stage Liver Disease (MELD) score, comprised of INR, bilirubin and creatinine and is used to prioritize patients on waiting list and data suggest that post-LTx MELD scoring is associated with increased 3-month mortality [2, 3].

• Further validation of the independent predictive ability of MELD scores in the first few weeks after LTx on long-term outcome has yet to be established.

Objective

- Our aim was to evaluate early continuous post-LTx measurements of the MELD score as an early independent prognostic factor for 1-year mortality or re-transplantation.
Kinetics of the MELD score

- **Death or re-LTx**
- **Survivors**

### Median (IQ-range) MELD score

<table>
<thead>
<tr>
<th>Day</th>
<th>Pre-LTx</th>
<th>Day 2</th>
<th>Day 4</th>
<th>Day 6</th>
<th>Day 8</th>
<th>Day 10</th>
<th>Day 12</th>
<th>Day 14</th>
<th>Day 16</th>
<th>Day 18</th>
<th>Day 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>15.0</td>
<td>16.0</td>
<td>17.0</td>
<td>18.0</td>
<td>19.0</td>
<td>20.0</td>
<td>21.0</td>
<td>22.0</td>
<td>23.0</td>
<td>24.0</td>
<td>25.0</td>
</tr>
<tr>
<td>IQ Range</td>
<td>14.0-16.0</td>
<td>15.0-17.0</td>
<td>16.0-18.0</td>
<td>17.0-19.0</td>
<td>18.0-20.0</td>
<td>19.0-21.0</td>
<td>20.0-22.0</td>
<td>21.0-23.0</td>
<td>22.0-24.0</td>
<td>23.0-25.0</td>
<td>24.0-26.0</td>
</tr>
</tbody>
</table>

### Graft failure (n)

- Pre-LTx: 39
- Day 2: 37
- Day 4: 36
- Day 6: 33
- Day 8: 35
- Day 10: 33
- Day 12: 33
- Day 14: 33
- Day 16: 31
- Day 18: 30
- Day 20: 28

### Total (n)

- Pre-LTx: 252
- Day 2: 249
- Day 4: 250
- Day 6: 243
- Day 8: 248
- Day 10: 240
- Day 12: 240
- Day 14: 232
- Day 16: 208
- Day 18: 192
- Day 20: 176
The post-LTx MELD score has a good discriminatory performance.
Kaplan-Meier estimates of graft failure according to quartiles of MELD at 10 days after LTx

Logrank (Q4 vs Q1-3), P < 0.0001

MELD score ≥17.2

Days after LTx

Proportion alive without re-LTx

Number at risk

<table>
<thead>
<tr>
<th>MELD quartile</th>
<th>15</th>
<th>100</th>
<th>185</th>
<th>270</th>
<th>355</th>
</tr>
</thead>
<tbody>
<tr>
<td>MELD quartile 1</td>
<td>61</td>
<td>61</td>
<td>59</td>
<td>59</td>
<td>56</td>
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<tr>
<td>MELD quartile 2</td>
<td>60</td>
<td>58</td>
<td>58</td>
<td>58</td>
<td>57</td>
</tr>
<tr>
<td>MELD quartile 3</td>
<td>60</td>
<td>59</td>
<td>57</td>
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<td>55</td>
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<tr>
<td>MELD quartile 4</td>
<td>59</td>
<td>47</td>
<td>42</td>
<td>39</td>
<td>36</td>
</tr>
</tbody>
</table>
The adjusted MELD score performs equally well

- Adjusted MELD day 10 (Q4 vs. Q1-3)
- Age (10 year increase)
- Bloodtype non-identical
- Pre-LTx MELD ≥35
- ET Donor Risk Index
- Autoimmune disease
- Hepatocellular Carcinoma
- Chronic viral disease

Hazard ratio (95% CI)
Conclusions

• The MELD score determined at day 10 post-LTx is a strong and independent predictor of 1-year mortality or re-LTx.

• The post-transplant MELD score reflect early allograft dysfunction.

• Pre-transplant recipient status and donor quality failed to predict having a high day 10 post-LTx MELD score, suggesting that events within first few days after LTx determines having a high day 10 post-LTx MELD score.

• The results will be confirmed in an independent dataset.
PERSIMUNE perspectives

- Our results illustrate the value of combining and re-thinking already available biochemical test results.

- Biochemical test results can be used as a prognostic marker to facilitate the development of better risk stratification management and thus increase patient safety. In PERSIMUNE we have a unique opportunity to analyze biochemical tests across groups of patients.

- The early post-transplant MELD score reflect the early allograft dysfunction. Most of the events that leads to excess deaths seen in LTx recipients with high MELD score at day 10 involves excess risk of infections. The factors within the first 10 days that explains such high MELD day 10 scores will be explored in PERSIMUNE as will factors that translate this early allograft dysfunction into excess risk of death thereafter.