WIfI Scoring with CLTI patients has important predictive value beyond amputation risk

Veith Symposium 2018
November 17, 2018

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The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk stratification based on Wound, Ischemia, and Foot Infection (WIfI)

Disclosures
Proctor/Consultant for Silk Road Medical.

Wound: extent and depth
Ischemia: perfusion/flow
Foot Infection: presence and extent

SVS Wound, Ischemia, Foot Infection (WIfI) system

- Purpose: allow accurate outcome analyses and comparisons between similar groups of patients
- Similar to TNM of Cancer Staging
- Goals
  - Descriptive: risk stratify patients according to disease natural history
  - Predictive: stratify patients with sufficient granularity to allow comparison on treatment strategies
- Characterizes each of the three major components

Stage 1
- Minimal ischemia; no/minor TL
- Not in strict “CL” definition

Stage 2
- Stage 1 with more infection
- Rest pain without infection
- Minor tissue loss/mod infection

Stage 3
- Range of tissue loss/ischemia
- Mild to mod infection

Stage 4
- Advanced in one or more categories

Stage 5: unsalvageable foot


**WIfI accurately predicts amputation risk**

### Estimated 1-Year Amputation Risk

<table>
<thead>
<tr>
<th>Study (year)</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cull (2014)</td>
<td>27 (15%)</td>
<td>63 (16%)</td>
<td>43 (23%)</td>
<td>8 (40%)</td>
</tr>
<tr>
<td>Zhao (2015)</td>
<td>29 (16%)</td>
<td>51 (21%)</td>
<td>53 (18%)</td>
<td>59 (69%)*</td>
</tr>
<tr>
<td>Darling (2015)</td>
<td>5 (0%)</td>
<td>111 (10%)</td>
<td>222 (11%)</td>
<td>213 (24%)</td>
</tr>
<tr>
<td>Cavney (2016)</td>
<td>21 (15%)</td>
<td>48 (19%)</td>
<td>42 (16%)</td>
<td>49 (20%)</td>
</tr>
<tr>
<td>Benchioura (2016)</td>
<td>29 (16%)</td>
<td>42 (16%)</td>
<td>29 (16%)</td>
<td>21 (13%)</td>
</tr>
<tr>
<td>Ward (2016)</td>
<td>5 (0%)</td>
<td>23 (15%)</td>
<td>14 (21%)</td>
<td>58 (29%)</td>
</tr>
<tr>
<td>Darling (2017)</td>
<td>22 (14%)</td>
<td>30 (16%)</td>
<td>24 (12%)</td>
<td>13 (15%)</td>
</tr>
<tr>
<td>Robinson (2017)</td>
<td>48 (4%)</td>
<td>67 (16%)</td>
<td>64 (16%)</td>
<td>83 (23%)</td>
</tr>
<tr>
<td>Mathioudakis (2017)</td>
<td>95 (6.5%)</td>
<td>33 (6%)</td>
<td>87 (8%)</td>
<td>64 (6%)**</td>
</tr>
</tbody>
</table>

**N = 2,820 (weighted mean)**

- 203 (3.2%) 733 (6.8%) 103 (6.8%) 998 (24%)
- Median (% 1 year amputation) 0% 8% 8% 22%

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**WIfI Score Predicts Other Important Outcomes in CLTI**

- Resource Utilization
  - Intensity of Multimodal Limb Care
  - Hospital LOS
- Patient-Centered Outcomes
  - Wound Healing
  - Independent living/ambulation
  - Need for Reintervention/Stenosis of Intervention

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**Results: Intensity of Multimodal Limb Care according to WIfI Stage**

- * Difference among WIfI Stages, P<0.05

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**Results: Wound Healing**

- 71% KM wound healing
- Median time to healing ~142 days

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**Results: Ambulatory and Independent Living Status**

<table>
<thead>
<tr>
<th></th>
<th>Lived at home on presentation (n=215)</th>
<th>Lived at home on follow-up (n=215)</th>
<th>p-value $^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>199 (92)</td>
<td>189 (86)</td>
<td>0.01</td>
</tr>
<tr>
<td>Stage 1</td>
<td>33 (87)</td>
<td>34 (89)</td>
<td>0.32</td>
</tr>
<tr>
<td>Stage 2</td>
<td>50 (91)</td>
<td>47 (87)</td>
<td>0.18</td>
</tr>
<tr>
<td>Stage 3</td>
<td>51 (91)</td>
<td>52 (93)</td>
<td>0.32</td>
</tr>
<tr>
<td>Stage 4</td>
<td>65 (98)</td>
<td>56 (82)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

* Comparison of status at presentation vs. on last follow-up
174 threatened limbs in 143 inpatients in amputation prevention program
Revascularizations and podiatric procedures increased with WIfI stage

992 first-time revascularizations for CLTI
Evaluate predictive ability of WIfI on RAS events
- Reintervention
- Amputation
- Stenosis
Evaluate “Composite” (0-9) and “Mean” (0-3) WIfI scores

WIfI Composite and Mean Scores accurately predicted RAS events in each cohort
- All revascularizations
- Endo
- Open

Conclusions
- WIfI accurately predicts amputation risk (an important patient-centered outcome)
- WIfI score correlates with intensity of care and utilization of resources
- Initial evidence that it correlates with other important patient-centered outcomes
  - Wound healing
  - Ambulation
  - Independent living
  - Reintervention
The Value of WIfI

- Important prognostic information
- Staging tool which allows accurate comparison of groups across a number of metrics and outcomes
  - Treatments of CLTI / DFU
    - Revascularization vs. “Conservative” therapy
    - Open vs. endo
    - Effectiveness of limb preservation programs
    - Wound care and medical treatment
- Need to prospectively validate WIfI in predicting appropriate resource utilization and patient-centered outcomes
  - Captured in VQI, BEST CLI, BASIL 2 and 3