Development and validation of a nomogram incorporating the 31-GEP test and clinicopathologic factors for accurate prediction of recurrence risk in patients with cutaneous melanoma


BACKGROUND

- Patients with cutaneous melanoma (CM) have an individual recurrence risk determined by clinical, pathological, and genetic features.
- The 31-gene expression profile (31-GEP) test is an independent significant predictor of 5-year risk of recurrence and distant metastasis.1-7
- 31-GEP results classify tumor biology as lowest-risk (Class 1A), low-risk (Class 1B), high-risk (Class 2A), and highest-risk (Class 2B):

**RESULTS CONTINUED**

**CONCLUSIONS**

- This nomogram combines the 31-GEP test result with clinical features to create a clinically useful, accurate tool for determining an individual’s risk of recurrence to optimize patient care.
- Because Sentinel Lymph Node (SLN) status is not a feature in this nomogram, this tool can be used to provide patient risk of recurrence prior to or in the absence of a SLN biopsy.
- A future aim of this study is to generate a mobile application for conversion of clinical and molecular data to a patient’s recurrence risk.

### REFERENCES


### DISCLOSURES

Castle Biosciences, Inc (CBI) provided statistical analysis support for nomogram development. KRC and HGC are employees and option holders of CBI. Prospective cohort registry is independently managed by the Cutaneous Oncology Research Consortium (CORC). RT, DB, JZ have no relevant disclosures.

### METHODS: NOMOGRAM DEVELOPMENT

- A prospective cohort of 685 patients from 9 dermatology centers with minimum 1yr follow-up or a recurrence event at any time was included in nomogram development.
- A logistic regression model was fitted on clinical and pathological data to determine relative predictive value for recurrence risk. Covariate inclusion for the model was selected by lowest Bayesian information criteria (BIC) value with fewest clinical features.
- The nomogram was validated on a retrospective cohort of 901 Stage I-III CM patients with ≥ 5 years follow-up or a recurrence event, and goodness of fit was determined by linear regression.

### OBJECTIVE: To develop a nomogram tool combining 31-GEP class and clinicopathologic risk features for predicting CM recurrence.

### RESULTS

#### Table 1. Patient clinical and pathologic features per 31-GEP Class

<table>
<thead>
<tr>
<th>All patients n=685</th>
<th>Class 1A n=557</th>
<th>Class 1B n=41</th>
<th>Class 2A n=33</th>
<th>Class 2B n=54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age median (range), years</td>
<td>67 (22-90)</td>
<td>65 (22-90)</td>
<td>71 (33-90)</td>
<td>71 (52-91)</td>
</tr>
<tr>
<td>Breslow thickness (range), mm</td>
<td>0.5 (0.1-13)</td>
<td>0.5 (0.1-5)</td>
<td>0.8 (0.2-6)</td>
<td>1.2 (0.2-7.5)</td>
</tr>
<tr>
<td>Male</td>
<td>60% (411/685)</td>
<td>59% (330/557)</td>
<td>51% (21/41)</td>
<td>79% (26/33)</td>
</tr>
<tr>
<td>Ulceration present</td>
<td>7% (50/685)</td>
<td>3% (17/557)</td>
<td>7% (3/41)</td>
<td>6% (2/33)</td>
</tr>
<tr>
<td>Mitotic rate ≥ 2 mm²</td>
<td>18% (121/685)</td>
<td>9% (52/557)</td>
<td>32% (13/41)</td>
<td>52% (17/33)</td>
</tr>
</tbody>
</table>

#### Figures

- **Figure 1.** Multivariate Cox regression analysis of 31-GEP and clinicopathologic features
- **Figure 2.** Kaplan-Meier estimation of Recurrence-Free Survival (RFS)
- **Figure 3.** Optimum Model selected by BIC
- **Figure 4.** Validation of the nomogram in a retrospective cohort of 901 patients with Stage I-III cutaneous melanoma
- **Figure 5.** Impact of T stage and 31-GEP on risk of recurrence