Use of p53 and Ki67 as Biomarkers in Head and Neck Squamous Cell Carcinomas

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ABSTRACT

OBJECTIVE To determine whether p53 and Ki67 can be used to predict outcomes in head and neck cancer patients.

METHODS A retrospective review was performed on head and neck cancer patients treated at a tertiary care academic institution. 228 patients met inclusion criteria for analysis, and the median follow-up time was 21.8 months.

RESULTS Both tumor markers were associated with gender, tumor site, and treatment with chemotherapy. p53 and Ki67 were not associated with outcomes. Given these findings, p53 and Ki67 should not be used to guide therapy or staging for head and neck cancer at this juncture.

CONCLUSION While p53 and Ki67 demonstrate associations with factors related to worse patient outcomes, they are not associated with outcomes. Given these findings, p53 and Ki67 should not be used to guide therapy or staging for head and neck cancer at this juncture.

INTRODUCTION

Head and neck squamous cell carcinoma (SCC-HN) has a high morbidity and mortality rate. The five-year survival rate for SCC-HN is only 50%.

Molecular markers have been used in other cancers, most notably breast cancers, to alter treatment regimens based on risk gender, oropharynx tumor site, and treatment with chemotherapy. The clinical significance of all three of these results is unclear.

p53 wild-type protein degrades quickly when prepared and cannot be adequately detected with staining techniques. This does allow for the possibility of false negative results, since early stop codon mutations are significant enough to eliminate protein production altogether.

Ki-67 was not associated with overall survival or recurrence. There were associations found between Ki-67 and several variables (Table 2). Since Ki-67 is a cell proliferation marker, these associations are not surprising.

Tumors with higher cellular proliferation are more aggressive, so it would stand to reason that these tumors would be worse, that is, have more aggressive characteristics such as poorly differentiated cell grades, higher stage, increased risk of positive lymph node metastases, and require radiation and chemotherapy treatments.

The length of follow-up is a limitation of our study, since these markers may show associations with five or even ten years of follow-up data.

DISCUSSION

Demographic data in our study were associated with known characteristics of SCC-HN patients, including male predominance (Table 1) and advanced age.

p53 expression was not associated with overall survival or recurrence. There was a positive association between p53 expression and male gender, oropharynx tumor site, and treatment with chemotherapy. The clinical significance of all three of these results is unclear.

The length of follow-up is a limitation of our study, since these markers may show associations with five or even ten years of follow-up data.

CONCLUSIONS

Our study results show that in the short term, p53 and Ki-67 are not predictive for overall survival or recurrence in head and neck squamous cell carcinomas.

Most of the factors that Ki-67 was associated with in this study are predictable based on the nature of this marker. The clinical significance of the associations found related to p53 and Ki-67 in Table 2 is unclear.

Longer follow up time may reveal one or both of these markers to be useful in making clinical decisions about treatment in head and neck squamous cell carcinomas.

Table 1: Summary of patient data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male 171 (66.2)</td>
</tr>
<tr>
<td>Race</td>
<td>White 209 (91.7)</td>
</tr>
<tr>
<td>Pathology Grade</td>
<td>Well-diff 29 (12.7)</td>
</tr>
<tr>
<td>Lymph node status</td>
<td>None excised 51 (22.4)</td>
</tr>
</tbody>
</table>

Table 2: Associations between variables and tumor marker status

<table>
<thead>
<tr>
<th>Variable</th>
<th>p53 p-value</th>
<th>Ki67 p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.02</td>
<td>0.021</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>No 0.55</td>
<td>No 0.069</td>
</tr>
<tr>
<td>Tumor site</td>
<td>Male 0.01</td>
<td>0.00091</td>
</tr>
<tr>
<td>Tumor cell grade</td>
<td>Poorly-diff 0.84</td>
<td>0.7411</td>
</tr>
<tr>
<td>Positive lymph nodes</td>
<td>No 0.02</td>
<td>0.014</td>
</tr>
<tr>
<td>Stage</td>
<td>0.61</td>
<td>0.03</td>
</tr>
<tr>
<td>Treatment with radiation</td>
<td>No 0.32</td>
<td>0.014</td>
</tr>
<tr>
<td>Treatment with chemotherapy</td>
<td>No 0.03</td>
<td>0.002</td>
</tr>
<tr>
<td>Overall survival</td>
<td>No 0.66</td>
<td>0.96</td>
</tr>
<tr>
<td>Recurrence of disease</td>
<td>No 0.94</td>
<td>0.80</td>
</tr>
</tbody>
</table>

REFERENCES


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