Radiotherapy on the neck nodes predicts malnutrition in patients with early stage laryngeal cancer

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Rationale

- Malnutrition is a well-known problem during radiotherapy in patients with head and neck cancer
- Patients with early stage laryngeal cancer are thought to have few nutritional problems
- A substantial number of these patients do have severe weight loss at the end of radiotherapy (RT)
Objectives

- Evaluation of weight loss in patients with early stage laryngeal cancer before and during radiotherapy

- Selecting prognostic factors for early identification of patients in need of intensive nutritional support during radiotherapy
Patients

- T1 or T2 glottic, supraglottic or subglottic laryngeal cancer
- Age over 18 years
- Primary RT (without chemotherapy) for at least 4 weeks
Methods

Between 1999 and 2007, data were collected weekly during radiotherapy

• Weight
• Toxicity scores (RTOG/EORTC system):
  - mucositis
  - xerostomia
  - dysphagia
• General characteristics
• Treatment schedule
• QOL scores
Statistical analyses

- Malnutrition was defined as $\geq 5\%$ weight loss during radiotherapy

- Association between prognostic variables and malnutrition was analyzed by Cox proportional hazard regression analysis ($p<0.05$)
# Patient characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>207</td>
<td>(87)</td>
</tr>
<tr>
<td>Female</td>
<td>31</td>
<td>(13)</td>
</tr>
<tr>
<td><strong>Age, year (mean ± SD)</strong></td>
<td>66</td>
<td>±11</td>
</tr>
<tr>
<td><strong>Tumor location</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laryngeal, Glottic</td>
<td>187</td>
<td>(79)</td>
</tr>
<tr>
<td>Laryngeal, Supraglottic</td>
<td>48</td>
<td>(20)</td>
</tr>
<tr>
<td>Laryngeal, Subglottic</td>
<td>3</td>
<td>(1)</td>
</tr>
<tr>
<td><strong>T staging</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>112</td>
<td>(47)</td>
</tr>
<tr>
<td>T2</td>
<td>126</td>
<td>(53)</td>
</tr>
<tr>
<td><strong>N staging</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N0</td>
<td>226</td>
<td>(95)</td>
</tr>
<tr>
<td>N1 or N2</td>
<td>11</td>
<td>(5)</td>
</tr>
</tbody>
</table>
Toxicity and malnutrition during RT

Percentage of occurrence of xerostomia, mucositis, dysphagia and malnutrition during radiotherapy
Prognostic variables for malnutrition

- Female versus male
- Age
- Performance status
- Subglottic versus glottic
- Supraglottic versus glottic
- T2 versus T1
- N+ versus N0
- RT on neck nodes
- 70 versus 60 Gray
- Second tumor

Hazard ratio with 95% CI
Prognostic variables for malnutrition

- pain
- social eating
- swallowing
- senses problems
- dry mouth
- painkillers
- teeth
- opening mouth
- sticky saliva
- felt ill
- nutritional supplement
- weight loss
- weight gain

Hazard ratio with 95% CI
### Multivariate model at baseline

<table>
<thead>
<tr>
<th>Variables</th>
<th></th>
<th>HR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 RT on neck nodes</td>
<td></td>
<td>Yes versus No</td>
<td>4.14</td>
<td>2.61 to 6.57</td>
</tr>
<tr>
<td>2 RT on neck nodes</td>
<td></td>
<td>Yes versus No</td>
<td>4.16</td>
<td>2.62 to 6.60</td>
</tr>
<tr>
<td>Dry mouth H&amp;N-35</td>
<td></td>
<td>Yes versus No</td>
<td>1.72</td>
<td>1.14 to 2.60</td>
</tr>
</tbody>
</table>
Diagnostic accuracy for malnutrition

<table>
<thead>
<tr>
<th>Diagnostic accuracy (%) of the predictive variables for malnutrition</th>
<th>RT neck nodes (1)</th>
<th>RT neck nodes &amp; dry mouth (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>Specificity</td>
<td>73</td>
<td>48</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>70</td>
<td>62</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>75</td>
<td>74</td>
</tr>
</tbody>
</table>
Conclusion

- Almost half of patients (44%) with early stage laryngeal cancer are at risk of malnutrition during radiotherapy.
- RT on the neck nodes predicts malnutrition in patients with early stage laryngeal cancer.
- Offer nutritional support to all T1 and T2 laryngeal cancer patients who receive nodal irradiation.

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