Audit of head and neck set-up accuracy in radical head and neck radiotherapy

T Guerrero Urbano, M Khaira, E Larbi, S Whitaker
St Luke’s Cancer Centre, The Royal Surrey County Hospital, Guildford, GU2 7XX, UK

RESULTS 2

Table 3. Isocentre displacements in simulator images with reference on planning CT scan

<table>
<thead>
<tr>
<th>A-P image</th>
<th>S-I</th>
<th>R-L</th>
<th>A-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 mm</td>
<td>21</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>3-5 mm</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Table 4. Direction of isocentre displacements in simulator images

<table>
<thead>
<tr>
<th>A-P image</th>
<th>S-I</th>
<th>R-L</th>
<th>A-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 mm</td>
<td>2</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>3-5 mm</td>
<td>1</td>
<td>1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

A systematic error was introduced in 11 (44%) patients by using the simulator images as reference images, 5 in the A-P images and 10 in the lateral images.

Simulator images did not show a statistically significant correlation with EPI set-up measurements.

OUTCOME MEASURES

- Proportion of measurements <3mm and <5mm.
- Systematic Set-up Error (SSE) and Random Set-up Error (RSE). Subgroup analysis 1: SSE introduced by using simulated orthogonal images as reference images and correlation with SSE throughout treatment.
- Subgroup analysis 2: Impact of weight loss on SSE in patients treated with chemoradiotherapy.

METHODS

- Data was analysed from a prospective database of 75 patients treated with RT between December 2007 and August 2008. Simulator orthogonal images were generated and used as reference images using an off-line correction protocol.
- The value and direction of translational displacements in the simulator images and EPs were recorded. Statistical analysis was performed using SPSS v11 for Windows.

RESULTS 3

The combination of SSE and set-up error in the A-P direction (mean of four fractions) was the only significant predictor (p<0.022) of the set-up error in the A-P direction, with a correlation coefficient (r) of 0.7 (p<0.0001).

CONCLUSIONS

- Analysis of set-up errors confirms that the thermoplastic immobilisation device introduced at SLCG in 2007 provides a level of set-up accuracy that compares well to published data and is therefore suitable to use as routine in the treatment of radical 3D-CRT and IMRT treatments of the head and neck.
- A CTV to PTV margin for set-up of 3mm in all directions is appropriate.
- A statistically significant correlation was found between the percentage of weight loss up to week 4 (r=0.09, p=0.002) and between weeks 4 and end of treatment (r=0.5, p=0.007) and total weight loss.
- A trend was found for larger mean AP set-up errors as patients lost a larger proportion of total body weight, which reached statistical significance in patients who lost >7% (0.7mm, p=0.03, Wilcoxon Signed Ranks Test).

REFERENCES

- On Target: Ensuring Geometric Accuracy in Radiotherapy, RCR, 2008