Comparing Patient Setup Techniques utilizing Optical Surface Guidance and Conventional Tattoo/Laser Alignment from Cherenkov Image Consistency Metrics

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Main Findings

The hypothesis that there exists a significant difference between the Cherenkov image-evaluated consistency between the optical surface guidance setup technique and the conventional skin marks/lasers setup technique was nullified after analysis using a two-tailed t-test of unequal variance.

Table 1: Data are tabulated for the first 20 sets of equal variance. The means are listed in red, L/R indicating systematic offsets. The null hypothesis is rejected for each statistic, indicating that there is a statistically significant difference in the means.

Table 2: Fractions are tabulated and compared. As is shown, each image thumbnail from a ceiling view of the patient shows a difference in the light imaged at the surface. Differences are usually higher in the first day of treatment, or the treatment plan.

This study presents the first comparison of quantitative consistency between two widely used setup techniques using remote imaging of Cherenkov light, incorporating the largest cohort of patient data available.

While no significant differences separated conventional laser alignment to SGRT, MDC was shown to be less insignificant, indicating that this metric may be more sensitive to change, and that more patient data could potentially frame different conclusions in future work.

FUNDING / DISCLOSURES / CONTACT

TABLE 1

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Mean (SD)</th>
<th>L</th>
<th>R</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Day</td>
<td>0.12 (0.05)</td>
<td>0.04</td>
<td>0.08</td>
<td>2.15</td>
<td>0.04</td>
</tr>
<tr>
<td>Second Day</td>
<td>0.17 (0.06)</td>
<td>0.03</td>
<td>0.07</td>
<td>2.67</td>
<td>0.01</td>
</tr>
</tbody>
</table>

FIGURE 1: The first two sets of equal variance were imaged at each site. The means are listed in red, L/R indicating systematic offsets. The null hypothesis is rejected for each statistic, indicating that there is a statistically significant difference in the means.

FIGURE 2: The first two sets of equal variance were imaged at each site. The means are listed in red, L/R indicating systematic offsets. The null hypothesis is rejected for each statistic, indicating that there is a statistically significant difference in the means.

FIGURE 3: The first two sets of equal variance were imaged at each site. The means are listed in red, L/R indicating systematic offsets. The null hypothesis is rejected for each statistic, indicating that there is a statistically significant difference in the means.

FIGURE 4: The first two sets of equal variance were imaged at each site. The means are listed in red, L/R indicating systematic offsets. The null hypothesis is rejected for each statistic, indicating that there is a statistically significant difference in the means.

FIGURE 5: The first two sets of equal variance were imaged at each site. The means are listed in red, L/R indicating systematic offsets. The null hypothesis is rejected for each statistic, indicating that there is a statistically significant difference in the means.