ABSTRACT SUBMISSION FORM
Please email to: info@mriinrt2018.com with ‘abstract’ as the subject

<table>
<thead>
<tr>
<th>Name (First, last)</th>
<th>Christian Gustafsson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mailing address (including province/state, country, postal/zip code)</td>
<td>Klinikgatan 5, 221 85 Lund, Sweden</td>
</tr>
<tr>
<td>Institution/organization</td>
<td>Skåne University Hospital</td>
</tr>
<tr>
<td>Position</td>
<td>Medical Physicist / PhD student</td>
</tr>
<tr>
<td>Telephone (including country prefix)</td>
<td>+46 46 177647</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:christian.k.gustafsson@skane.se">christian.k.gustafsson@skane.se</a></td>
</tr>
</tbody>
</table>

The submission is to be considered in the following category
☐ Oral presentation preferred
☐ Poster presentation only

Trainee status
☐ I am a trainee (student or postdoctoral fellow)
☐ I wish to be a candidate for best student paper/poster

PRESENTATION TITLE
Multimodality assessment of gold fiducial marker inter-distance measurements for prostate patients in an MRI-only based radiotherapy workflow

AUTHOR(S)
C. Gustafsson*1,2, E. Persson1,2, E. Palmér3 and LE. Olsson1,2

1) Department of Hematology, Oncology and Radiation Physics, Skåne University Hospital, Lund, 221 85, Sweden
2) Department of Translational Medicine, Medical Radiation Physics, Lund University, Malmö, 205 02, Sweden
3) Department of Radiation Physics, Sahlgrenska University Hospital, Gothenburg, 413 45, Sweden

ABSTRACT
Purpose:
To evaluate if measured distances between intra-prostatic gold fiducial markers (GFM) were comparable between synthetic computed tomography (sCT)-, computed tomography (CT)- and cone beam CT (CBCT) images.

Methods:
Ten patients from a prostate magnetic resonance imaging (MRI)-only radiotherapy treatment workflow was selected for investigation. CT was acquired for the purpose of dose verification. The sCT was created using MRi-Planner (Spectronic). The center of mass (CoM) for three intra-prostatic GFM in each patient was manually determined in T2-weighted MRI-images, transferred to the corresponding sCT-images and represented by a round 4 mm diameter fiducial. Fiducial CoM in CT, sCT and CBCT was automatically determined in an in-house software. For each patient and for all image modalities, the distances between the GFM was calculated. The difference in inter-fiducial distances was calculated between sCT vs. CT, CBCT vs. CT, and in sCT vs. CBCT. The 2D projected inter-fiducial distances in frontal and lateral treatment setup X-ray images for 39 treatment fractions per patient was calculated for nine patients with similar image analysis methods. The daily variation of inter-fiducial distances was calculated by subtracting the mean inter-fiducial distance from the measured inter-fiducial distance for each patient.
Name (First, last) | Christian Gustafsson
---|---
Mailing address (including province/state, country, postal/zip code) | Klinikgatan 5, 221 85 Lund, Sweden
Institution/organization | Skåne University Hospital
Position | Medical Physicist / PhD student

**Results:**
The mean inter-fiducial total distance difference was for the modality comparisons sCT vs. CT, CBCT vs. CT, sCT vs. CBCT found to be: 0.2±1.5 [-2.7 3.9], -0.3±0.9 [-2.0 1.2], and 0.2±1.6 [-3.8 4.0]. The mean day to day variation in inter-fiducial distances for the frontal and lateral setup images was determined to be 0.0±0.5 [-1.5 2.5] and 0.0±0.6 [-1.5 2.4].

**Conclusion:**
With respect to the maximum daily variation, measurements of inter-fiducial distances between CT and CBCT were similar. Comparison with sCT yielded larger deviations than the daily variation. We assume that the manual GFM identification is hampered by the limited spatial resolution of the MRI-image.