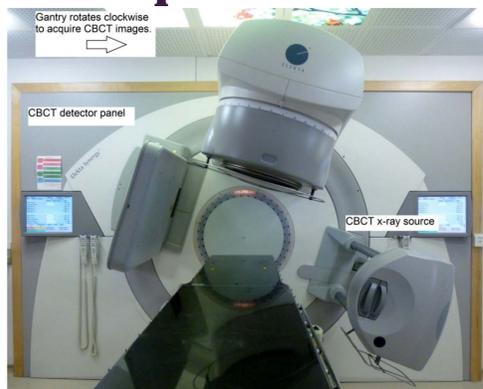


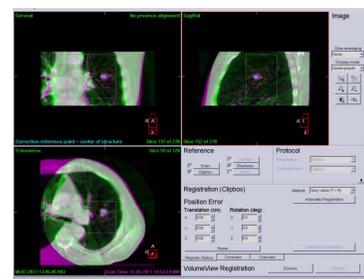
Are therapeutic radiographers able to achieve a clinically acceptable match for stereotactic lung radiotherapy treatment (SBRT)?

Jacqueline Hudson MSc, Dr Fiona McDonald, Dr Merina Ahmed, Caroline Doolan MSc, Jan Balycky MBA, Dr Helen McNair
Radiotherapy Department, Royal Marsden NHS Foundation Trust, Downs Rd, Sutton, Surrey

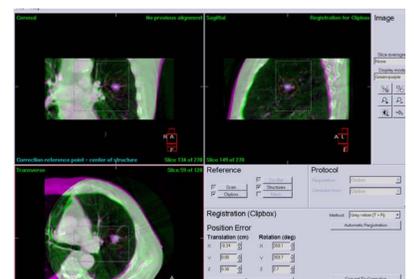
Elekta Linear accelerator with cone beam computerised tomography



Online CBCT images co-registered with localisation CT image set



Uncorrected green/purple view XVI R4.5



Corrected green/purple view XVI R4.5

Background

SBRT for treatment of early stage peripheral non-small cell lung cancer (NSCLC) improves outcomes (1). However, daily on-line imaging is essential to ensure accuracy in delivery of these hypofractionated high-dose treatments (2,3). Currently in our department on-line verification of cone beam computerised tomography (CBCT) images for SBRT is performed by a clinical oncologist. The National Radiotherapy Advisory Group (NRAG) have recommended more effective use of the skilled multi-professional workforce to meet the demands of an ever expanding radiotherapy service (4). Utilising therapeutic radiographers to perform on-line verification improves efficiency but requires competency to be assessed before implementation.

Aim

To prospectively assess the accuracy of radiographer verification of CBCT images for SBRT treatment delivery.

Standard

The clinical oncologist's verification match was taken as the audit standard. The indicator was defined as a radiographer match within 2 mm of the clinician's with a target of 90% agreement.

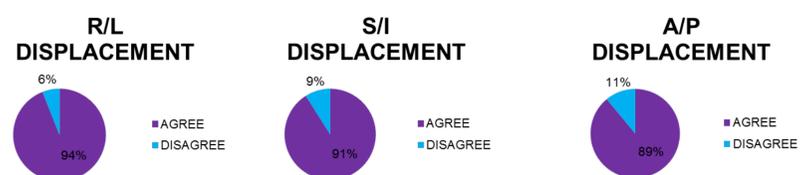
Methodology

Five radiographers co-registered 22 CBCT images acquired at the first fraction of SBRT for 22 patients (Elekta Synergy, XVI R4.5). Displacements in each translation were compared to the clinical oncologist's match.

Results

Agreement for all radiographers when compared with the clinical oncologist match was 94%, 91% and 89% in the right-left (RL) superior-Inferior (SI) and anterior-posterior (AP) directions respectively. Intraclass Correlation Coefficient (95% confidence interval) between radiographers were 0.87 (0.76 to 0.94), 0.74 (0.51 to 0.88), 0.88 (0.78 to 0.95) in the RL, SI and AP direction respectively. The average time taken for registration was 128 seconds. Tumour visualisation appeared to be affected by several factors including GTV size, tumour location within the thorax and chest wall thickness.

Pie charts showing agreements



Conclusion

Suitably experienced therapeutic radiographers are able to verify CBCT images for thorax SBRT with comparable results to the 'gold standard' clinical oncologists' match.

Action plan

- Development of an advanced competency training workbook using CBCT verifications which demonstrated consistent and inconsistent registrations.
- Local implementation of radiographer-led on-line image verification for SBRT.
- Re-audit after implementation to ensure competencies maintained.

Email Jacqui.Hudson@rmh.nhs.uk or Helen.McNair@rmh.nhs.uk

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