AlignRT out of tolerances data compared to CBCT. In part because of the lack of homogeneous procedures for complex cases in the Department before July 18, 25/506 pts in G2 couldn't be further managed with AlignRT despite a new scan +/- new plan vs 37/506 in G1; 31/506 pts in G2 did not perform a new CT scan despite persistent discrepancies between AlignRT and CBCT.

Conclusion

In our series, AlignRT motion management is robust and efficient for 89% of breast cancer VMAT treatments. For the remaining 11%, AlignRT has been definitely stopped during the treatment for several reasons i.e. anatomy changes, pain, and out-of-tolerance-data compared to CBCT. An inhomogeneous decision-making among the team could be involved in some of these stops. We thus implemented a decision tree since July 18 with the aim to increase the rate of treatments without any stop. We now prospectively collect data to evaluate this implementation

PV-0578 Image quality of cone beam CT used as image-guidance for pelvic Stereotactic Ablative Radiotherapy

F. Slevin[1], M. Beasley[2], A. Needham[2], J. Lilley[3], R. Speight[3], L.J. Murray[1], A.M. Henry[1]

[1]Leeds Cancer Centre, Clinical Oncology, Leeds, United Kingdom; [2]Leeds Cancer Centre, Therapeutic radiography, Leeds, United Kingdom ; [3]Leeds Cancer Centre, Medical Physics, Leeds, United Kingdom

Purpose or Objective

Abdomino-pelvic Stereotactic Ablative Radiotherapy (AP-SABR) is increasingly used to treat oligo-metastatic pelvic nodal disease. Cone beam CT (CBCT) is used for image-guided radiotherapy (IGRT), but image quality is limited by scattered radiation, use of low-dose protocols and streak artefacts from moving bowel gas. These factors could make the process of AP-SABR target-matching more difficult. This retrospective single centre study investigated the extent to which CBCT image quality influenced the ease of AP-SABR target-matching and determined the proportions of images affected by factors limiting image quality.

Material and Methods

11 consecutive patients treated with AP-SABR were investigated. Two experienced therapy radiographers retrospectively independently reviewed 139 CBCTs acquired before and after each SABR fraction from these patients in the XVI (Elekta) IGRT system. Target-matching was performed between the planning CT and each CBCT image. Image quality was assessed using a four-point Likert scale (image quality for target-matching excellent, satisfactory, poor or impossible to use). Factors used to determine chosen score were presence of streak artefacts close to the target, lack of soft tissue contrast, small size of target and lack of surrogate structure to aid target matching. Descriptive statistics are presented.

Results

CBCT image quality scores were judged by assessors 1 and 2 as excellent in 6 (4.3%) and 8 (5.8%) of 139 images respectively; satisfactory in 63 (45.3%) and 89 (64%) respectively; poor in 66 (47.5%) and 40 (28.8%) respectively; and impossible to match in 4 (2.9%) and 2 (1.4%) images respectively (Figure 1). Streak artefact close to the target was observed in 89 (64%) and 62 (44.6%) images respectively. Source of artefacts was small bowel or combination of small and large bowel in a quarter and three-quarters of images respectively. Lack of soft tissue contrast was observed in 86 (61.9%) and 70 (50.4%) images respectively. Small size of target was found in 70 (50.4%) and 10 (7.2%) images respectively. Lack of surrogate was observed in 13 (9.4%) and 0 images respectively (Figure 2). Agreement between assessors for Likert scores, presence of streak artefacts, lack of soft tissue contrast, small target size and lack of surrogate was seen in 54 (38.8%), 56 (40.3%), 83 (59.7%), 73 (52.5%) and 126 (90.6%) of images respectively.

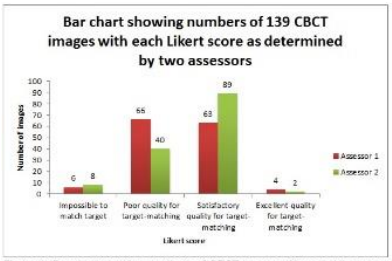

Figure 1: Bar chart showing numbers of CBCT images with each Likert score as determined by two assessors. Large proportion of images judged poor quality for target-matching

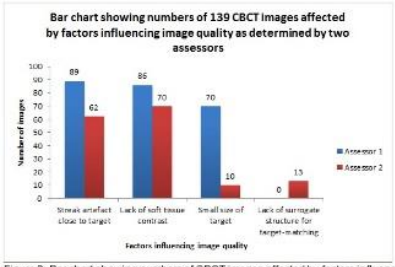

Figure 2: Bar chart showing numbers of CBCT images affected by factors influencing image quality as determined by two assessors. Note large proportion of images affected by streak artefact close to target and lack of soft tissue contrast.

Conclusion

Streak artefacts from moving bowel gas close to the target, especially from small bowel or combination of small and large bowel, affected over half of CBCT images. Images were also affected by lack of soft tissue contrast in over half over images. In over a third of cases image quality was felt to be poor or impossible to use because of factors negatively affecting image quality. Use of anti-peristaltic agents to reduce streak artefacts and modification of CBCT dose to improve soft tissue contrast should be investigated. Considerable variation between assessor scores reflects the subjectivity of this assessment process.

PV-0579 The impact of intra-thoracic anatomical changes on the delivery of lung SABR

M. Beasley[1], S. Brown[2], R. Chuter[2], C. Faivre-Finn[3], K. Franks[1], L. Murray[4], M. Van-Herk[3], A. Henry[4]

[1]Leeds Cancer Centre- Leeds Teaching Hospitals NHS Trust, Radiotherapy Research Group, Leeds, United Kingdom; [2]The Christie NHS Foundation Trust, Radiotherapy Related Research, Manchester, United Kingdom ; [3]University of Manchester and The Christie NHS Foundation Trust, Radiotherapy Related Research, Manchester, United Kingdom ; [4]University of Leeds-Leeds Institute of Cancer and Pathology and Leeds Cancer Centre- Leeds Teaching Hospitals NHS Trust, Radiotherapy Research Group, Leeds, United Kingdom

Purpose or Objective

Although evidence is limited, it has been suggested that approximately 70% of locally advanced non-small cell lung cancer (NSCLC) patients undergoing curative radiotherapy develop intra-thoracic anatomical changes (ITACs), with fewer than 10% requiring a completely new treatment plan.[1] The impact of ITACs on patients receiving SABR for early stage NSCLC, however, is unknown.

The aim of this study is to describe the occurrence of ITACs on CBCT imaging and the impact in lung cancer patients treated with SABR. This study was conducted on behalf of the UK Advanced Radiotherapy Technologies Network (ART-NET).