

A case study of an incidental finding of PJP on CBCT imaging in a stage III lung patient undergoing radical radiotherapy:

A Therapeutic Radiographers experience



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Introduction:
Routine daily use of cone beam CT (CBCT) for treatment verification has become increasingly common within radiotherapy (Bissonnette et al., 2009; Schulze et al., 2009). These imaging technologies increase conformity due to their improved soft tissue definition, however present new challenges and opportunities through incidental findings suggestive of infection (Youssef et al., 2020). The first author, a therapeutic radiographer, presents a case of a patient with Pneumocystis jirovecii pneumonia (PJP) where radiographic changes were initially seen on CBCT imaging.

Method: A retrospective review of a patient’s treatment pathway.

- Course of events**
- Patient attended on fraction 13, routine daily pre-treatment CBCT images were acquired and reviewed online by the radiographers.
 - Radiographers identified sudden new ground glass lesions in contralateral lung out the radiotherapy treatment field.
 - Arranged review by Lung Specialist Therapeutic Radiographer; clinically review performed.
 - Patient was initially asymptomatic but bloods were taken as a precaution and escalated for medical review.
 - Patient was admitted for antibiotics but quickly became more unwell with CRP 462 and signs of sepsis.
 - Bronchoalveolar lavage confirmed the diagnosis of PJP.
 - Radiotherapy was held until the patient recovered, a further replan including radiobiology calculation were required.
 - Patient completed radical treatment.

Case Background:
Patient originally consented for concurrent chemoradiotherapy with Cisplatin and Vinorelbine and 55Gy in 20 fractions, for a stage III left lung non-small cell carcinoma. Unfortunately prior to treatment the patient underwent emergency surgery for a bowel perforation and sepsis subsequent to the planning scan. This lead to an approximate 2.5 week delay in starting radiotherapy. The patient recovered and proceeded with uni-modality radiotherapy. Upon attendance for fraction 1 of radiotherapy, post surgical weight loss and internal changes including a new pleural effusion treatment meant radiotherapy could not be reliably delivered and further replan was required.

Results:
This case highlights how CBCT changes can identify changes both within the treatment field and outside the treatment field. This case has led to an improvement project within the department to improve PJP prophylaxis using screening criteria as recommended by RCR guidelines. Departmental policy includes PJP Prophylaxis for all CCRT patients and risk stratification for radical radiotherapy. This patient had repeated short courses of steroids which may have increased their susceptibility to infection.

Conclusion:
Modern imaging technologies can help detect changes outside the treatment field. Therapeutic radiographers should be encouraged to review the whole CBCT field. They should feel confident to highlight changes seen on CBCT to clinicians as further assessment may lead to early identification of problems and improved outcomes for patients.

References
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Youssef, I., Donahue, B., Flyer, M., Thompson, S., Huang, A., & Gallant, F. (2020). Covert COVID-19: Cone Beam Computed Tomography Lung Changes in an Asymptomatic Patient Receiving Radiation Therapy. *Advances in Radiation Oncology*, 5(4), 715–721. <https://doi.org/10.1016/J.ADRO.2020.04.029>

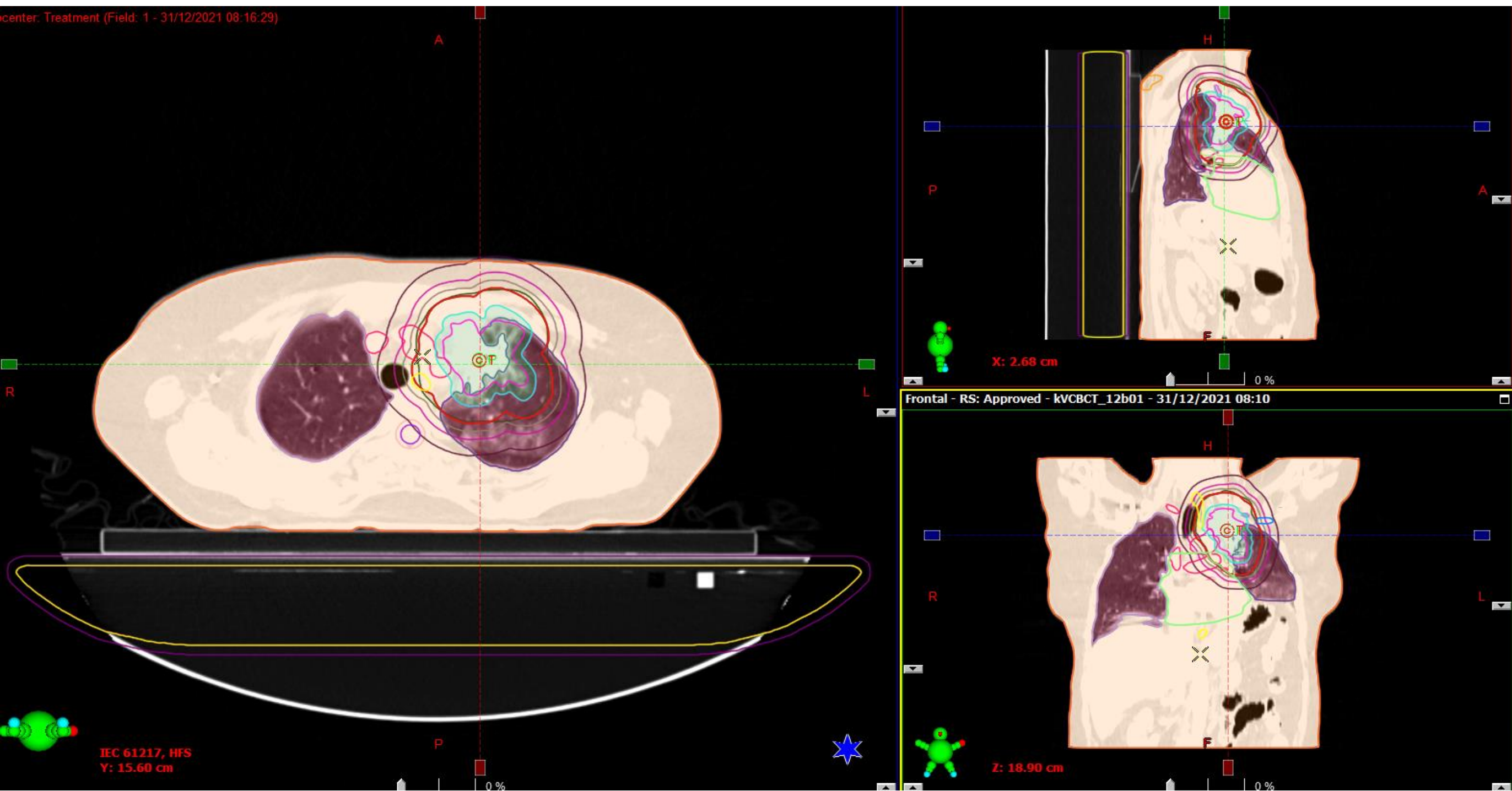


Figure 1 Planning scan

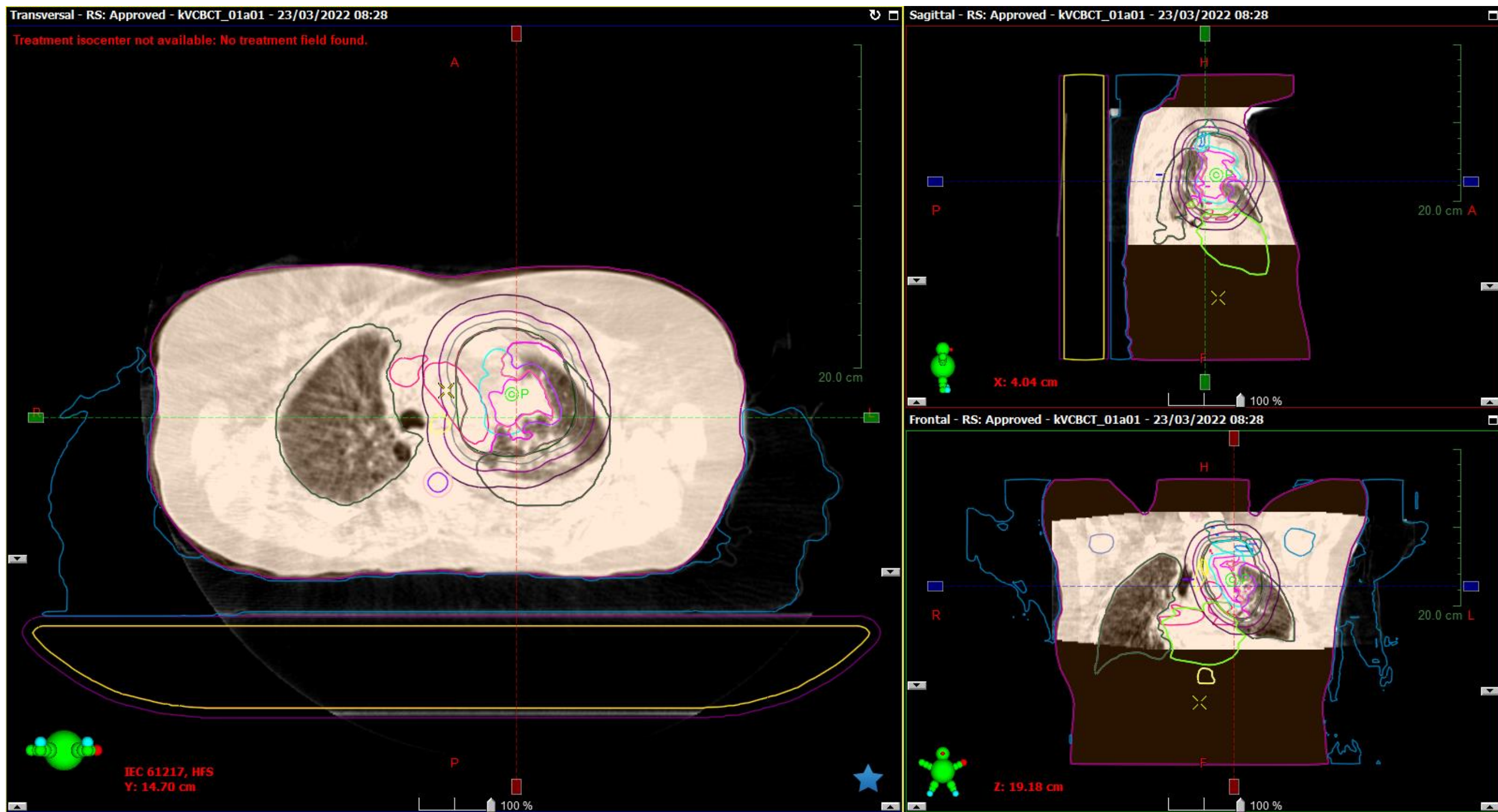


Figure 2 CBCT images from fraction 1

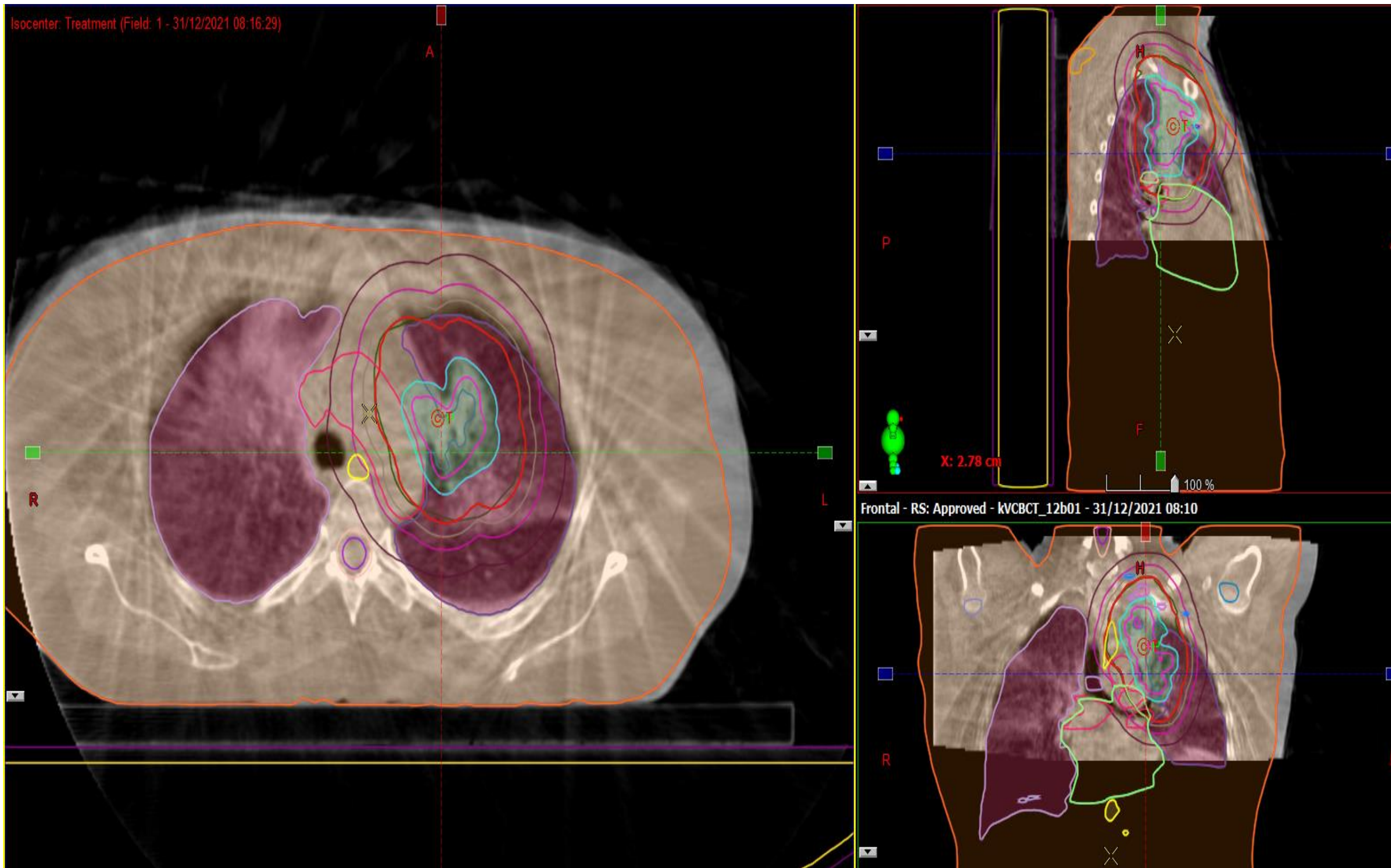


Figure 3 CBCT images from fraction 13