

A Novel Pretrial Contouring Exercise for the UK led PersonaLising Anal cancer radioTherapy dOse (PLATO) Trial

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Purpose/Objective(s)

The UK led *PersonaLisingAnal cancer radioTherapy dOse(PLATO)* is a complex integrated protocol, consisting of 3 distinct anal cancer trials. Anal cancer IMRT contouring is challenging as there are several nodal areas that are electively irradiated and the primary tumour is not well visualised on CT. We identified FALCON, an ESTRO supported multifunctional online contouring platform (EduCase), aimed at reducing contouring variability, as a method to streamline pre-trial radiotherapy (RT) quality assurance (QA). Investigators contoured a benchmark case using FALCON prior to attending workshops aimed at evaluating contouring variation and refining the trial RT protocol. We present qualitative feedback received from workshop participants. We also present conformity analysis of contours compared with a reference contour.

Materials/Methods

A T2N1 female case was selected. Clinical information was provided and PET/MRI imaging fused (rigid co-registration) to the planning CT to aid delineation. The trial RT protocol was used for target and OAR delineation. Conformity analysis of target structures (GTVA-primary, GTVN-positive node, and CTVE-elective nodes) in FALCON consisted of the Jaccard coefficient, Dice coefficient and Recall. Recall was defined as the fraction of volume overlapping with the reference volume. Jaccard and Dice were defined as below.

Jaccard Coefficient = $A \cap B / A \cup B$ Dice Coefficient = $2 \times (A \cap B) / (A + B)$ Where A was the reference volume contoured by lead trial clinicians and B that of an investigator.

Results

20 sets of contours were analyzed through FALCON. Average DICE was highest in GTVN and CTVE; 0.77 (0.6-0.94) and 0.76 (0.47-0.85) respectively, and lowest in GTVA, 0.7 (0.42-0.85). Average Jaccard was also highest in GTVN and CTVE; 0.63 (0.49-0.80) and 0.64 (0.33-0.74) respectively, and lowest in GTVA, 0.58 (0.34-0.76).

Whilst higher conformity metrics were seen on average in GTVN and CTVE a lower range of values was seen in CTVE. Subsequently changes were made to clarify CTVE contouring in the RT protocol. Changes were also made to clarify GTVA contouring, primarily stating the whole lumen is not to be included. Recall was generally consistent across GTVA, GTVN and CTVE; averaging 0.76 (0.35-0.99), 0.75 (0.55-0.97) and 0.73 (0.34-0.89) respectively, again a lower range of values were seen in GTVA and CTVE. More than 75% of the workshop participants (n=42) found FALCON to provide good to excellent help in contouring.

Abstract 2438; Table 1. Answers to the question: "How useful do you think FALCON was in completing the contouring exercises?"

Excellent	Good	Satisfactory	Poor
7 (17%)	25 (60%)	7 (17%)	3 (7%)

Conclusion

Use of the FALCON has streamlined the pre-trial QA exercise and was seen as an enhanced learning tool/environment for clinical contouring in the PLATO trial. Generation of conformity metrics has also been a useful tool in online quantitative QA review and revising trial guidelines. We would like to acknowledge FALCON Group and RadOnc eLearning Center for the use of EduCase

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