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GOOD CATCH

RO-ILS CASE STUDY 09

WHAT'S IN A NAME: USE OF FUNCTIONAL CONVENTIONS TO AID THE SECOND CHECK

Introduction:

Variability in both target and organ-at-risk (OAR) segmentation is a well-established potential source of radiation therapy planning errors[i] and may pose a challenge even for practices with robust safety processes. Several methods have been proposed to reduce contouring errors including use of standardized naming conventions[ii], use of automated tools for target and OAR generation[iii] and automated tools to detect contouring errors[iv]. The use of an incorrect expansion to generate the clinical target volume (CTV) or planning target volume (PTV) may be particularly difficult to detect given that such expansions are often based upon clinical judgement and may not be routinely documented which complicates use of second checks to verify the planned expansion. In this case, an incorrect target expansion was successfully caught by a practice due to use of standardized and functional naming conventions.

Event Overview:

The treatment intent was to expand the gross tumor volume (GTV) by 20 mm to generate a CTV, but due to an error by the radiation oncologist only a 7 mm expansion was generated. A plan was then created, based upon the incorrect expansion, and approved by the radiation oncologist. The expansion error was caught during a second physics check prior to treatment initiation when it was noted the CTV expansion did not match the structure name which contained the intended expansion. The error was corrected, and the patient replanned prior to treatment initiation.

Contributing Factors:

- Manual physician contouring error with incorrect GTV to CTV expansion.
- Absence of second check of expansions or review of contours earlier in the planning process.
- Bias of fast, automatic thinking during expansion generation.

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Lessons Learned/Mitigation Strategies:

1. Use of standardized naming conventions may allow detection of expansion errors which would otherwise be missed.
2. Implementation of prospective peer review, that includes a review of contours, may allow such errors to be detected prior to planning.
3. Development of tools/methods to check actual expansions relative to structure names may reduce unintended expansion errors.
4. Whenever possible, use of standardized expansions may allow detection, discussion and verification of atypical or outlier expansions, in context of appropriate safety culture.

This case, which involved an error in the GTV to CTV expansion, is perhaps most notable for how the error was caught rather than how it occurred. The CTV structure name included the intended CTV expansion, and during a second physics check it was noted that the structure name and the expansion were not the same. This provides an example of a practice with a robust planning process, given that documentation of the planned CTV expansion within the structure name facilitated objective assessment of the target, and allowed the error to be caught. American Association of Physicists in Medicine (AAPM) Task Group 263 offers guiding principles for standardized naming and should be leveraged by practices and vendors[ii]. Although the error was ultimately identified, additional process improvements to mitigate future error risk may include implementation of pre-planning segmentation rounds, with recent data suggesting such a process may allow greater detection of errors compared to traditional chart rounds[v]. Additionally, development of automated tools for consistency check of the expansion relative to the target name may reduce the risk of error propagation.

SAFETY CHECK

Does your practice have appropriate standardized naming and expansion conventions that could detect an erroneous CTV expansion?

References:

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[iv]Rhee DJ, Cardenas CE, Elhalawani H, et al. Automatic detection of contouring errors using convolutional neural networks. *Med Phys*. 2019;46(11):5086-5097.

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