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Letter to the Editor

Regarding: "The dosimetric impact of image guided radiation therapy by intratumoral fiducial markers"

To the Editor:

I read with interest the original report, "The dosimetric impact of image guided radiation therapy by intratumoral fiducial markers," by Yu et al.[1] For a cohort of pancreatic patients treated with image-guided radiation therapy (IGRT), the authors compared dosimetric coverage of the treated plan, which used intratumoral fiducial alignment, with coverage that would have been achieved had bone-anatomy alignment been used for treatments. Treatment plans were based on planning target volumes (PTVs), which were generated by expanding the internal target volumes (ITVs) by 5 mm in all directions. Dose re-evaluations were based on repeated isocenter shifts, dose recalculations, and dose summation to achieve the Bone Plan^{SUM}, and structures evaluated included the PTV, as well as organs at risk (OARs).

The purpose of the clinical target volume (CTV)-to-PTV (or ITV-to-PTV) margin is to ensure that the CTV/ITV receives the prescription dose when one accounts for (setup) uncertainties.[2-5] Ideally, planned dose to the PTV dose-volume histogram closely mirrors the dose received by the CTV/ITV when uncertainties are accounted for via dose summation. For all plans, it is likely that the dose received by the initial PTV will fall short of the planned dose to the PTV. This is to be expected because the purpose of the PTV is simply to maintain adequate dose to the underlying CTV/ITV. It follows that when dose coverage is assessed in the presence of uncertainties, as was done by Yu et al, it is appropriate to evaluate dose delivered to the CTV/ITV, not to the PTV. Yu et al did an impressive job of accumulating dose to reflect the difference between bone versus fiducial alignment. However, they evaluated dose deficits for the PTV, not for the CTV.

As the objective of Yu et al was to determine the "clinically relevant dosimetric impact of IGRT using intratumoral fiducial markers versus bony anatomy," it is important that the correct structure be used in the dose evaluation. Reanalysis of their data on the basis of CTV/ITV coverage from the shifted and summed dose would be most interesting, would show better coverage than the PTV, would be clinically relevant, and is strongly encouraged.

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