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Titel des Beitrags: Impact of interfractional changes in head and neck cancer patients on the delivered dose in intensity modulated radiotherapy with protons and photons.

Abstract: To investigate the influence of interfractional changes on the delivered dose of intensity modulated proton (IMPT) and photon plans (IMXT). Five postoperative head and neck cancer patients, previously treated with tomotherapy at our institute, were analyzed. The planning study is based on megavoltage (MV) control images. For each patient one IMPT plan and one IMXT plan were generated on the first MV-CT and recalculated on weekly control MV-CTs in the actual treatment position. Dose criteria for evaluation were coverage and conformity of the planning target volume (PTV), as well as mean dose to parotids and maximum dose to spinal cord. Considerable dosimetric changes were observed for IMPT and IMXT plans. Proton plans showed a more pronounced increase of maximum dose and decrease of minimum dose with local underdosage occurring even in the center of the PTV (worst IMPT vs. IMXT coverage: 66.7% vs. 85.0%). The doses to organs at risk (OARs) increased during the treatment period. However, the OAR doses of IMPT stayed below corresponding IMXT values at any time. For both modalities treatment plans did not necessarily worsen monotonically throughout the treatment. Although absolute differences between planned and reconstructed doses were larger in
IMPT plans, doses to OARs were higher in IMXT plans. Tumor coverage was more stable in IMXT plans; IMPT dose distributions indicated a high risk for local underdosage during the treatment course.