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Assessment of uncertainty in patient setup (prostate patients)

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The radiotherapy verification procedure allows us to be certain that we are treating the tumour volume per protocol. Geometric and dosimetric verifications are the two measurements required to ensure that the right radiation dose is directed to the correct area. When using geometric verification, the goal is to guarantee that the geometric accuracy of the radiotherapy delivered is within the limits set by the uncertainty margin permitted by the treatment plan. This is achieved by matching delivery data with the planned data. Verification is just one factor of the treatment process. However, accurate and reproducible planning processes, together with the acquisition of reference images of reasonable quality, are vital for achieving a successful verification. Mega Voltage Computer Tomography (MVCT) pre-treatment can be used in order to improve the accuracy of patient positioning in the X, Y and Z directions of a fixed coordinate system and thus lead to possible reductions in the tumour margin. In the prostate patient group, an average standard deviation of 5.06 (mmX), 1.64 (mmY) and 2.05 (mmZ) was found. Significant errors (7.08 mm) were detected in the prostate case in the X-axis. Targeted uncertainties in radiotherapy are set-up variation, internal organ displacement and volume change and deformation.

Biography

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