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Determination of Equivalent Uniform Doses for patient treated with the technique of Simulataneous Integrated Boost

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Radiotherapy, proton- and carbon-ion therapy, and boron neutron-capture therapy (BNCT) are among the treatment methods for head and neck tumors that are used in addition to surgery and chemotherapy. Of the former group, X-ray based radiotheraphy is the most commonly used.
Radiotherapy is based on irradiation of tumors with external beams of ionizing radiation. Its aim is to deliver the correct dose of radiation to a PTV (Planning Target Volume), minimizing it in critical organs, such as the brain. Among the possible methods for delivering this dose, the intensity modulated radiotherapy (IMRT) technique is the most promising one and analyzed in this work. It involves the use of several beams of radiation with a simultaneous modulation of their intensity, which allows to obtain the planned dose distribution. Such method is very good in cases when the patient has several separated areas of cancer cells, which require the deposit of different doses in different areas. An example of such situation is a tumor located around the head and neck, with the cancer cells on the two sides of organs such as the brainstem, spinal cord or eyes. A particular method within IMRT, which is ideally suited for treatment of such cases is the Simultaneous Integrated Boost (SIB) technique, in which all treated volumes are simultaneously irradiated with various doses. In this work, the mutual influences of deposited doses using SIB in individual Planning Treated Volumes was evaluated using the concept of Equivalent Uniform Dose (EUD).

Summary

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