

GENG-1: Assessment of secondary cancer risks for boron neutron capture therapy
[POSTER]

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Introduction: Boron neutron capture therapy (BNCT) is a binary targeted radiotherapy technology that has unique advantages in treating of head and lung tumors with high biological effectiveness and dosimetric advantages. More and more attention has been paid to the secondary cancer risk induced by radiotherapy. For cancer survivors, the secondary cancer risk caused by radiation threatens the quality of life for patients. With the development of neutron source and boron drug, BNCT will be used in clinical treatment for more cancer patients. However, there are few studies on secondary cancer risk in healthy organs for patients after BNCT. The purpose of this paper is to explore the secondary cancer risk in organs of tumor patients treated with BNCT, using a radiation computational phantom with Chinese physiological characteristics and Monte Carlo software.

Material and Methods: The 10-year-old, 15-year-old and adult male/female radiation computational phantom with Chinese physiological characteristics were established and utilized for dosimetry analysis. BEIR model was used for secondary cancer risk analysis. Head tumor and lung tumor patients was studied.

Results: The effects of tumor volume and depth, patient age and gender, neutron spectrum on the secondary cancer risk of brain tumor patients were studied. The results showed that the larger or deeper the tumor is, the greater the secondary cancer risks will be. The secondary cancer risks for healthy organs in male patients were mostly lower than that in female patients, and the total secondary cancer risk decreased with age. The time of different neutron spectrum to achieve the same treatment effect is different, the secondary cancer risk will also be different. Then, the effects of tumor location, tumor volume and neutron energy spectrum on the organs secondary cancer risk of lung tumor patients were studied. The results showed that tumor location had great influence on the secondary cancer risk in the healthy organs near the lung. Various tumor volume and neutron spectrum need different irradiation time to achieve the same treatment effect, the risk of secondary cancer of organs is also different.

Conclusion: In this work, the secondary cancer risks in healthy organs were evaluated when BNCT was used to treat head tumor patients and lung tumor patients, which provided a reference for the clinical application of BNCT.

Study of 4-borono-2- ^{18}F -fluoro-phenylalanine PET to estimate ^{10}B concentration in tumors and normal organs in Boron Neutron Capture Therapy