Contribution ID: **1114** Type: **Oral**

The possibility investigation of electron beam deep dose distribution formation by 3D-printed plastic bolus

Monday, 24 October 2022 16:20 (15 minutes)

Radiation therapy is an effective approach for cancer treatment. Electron beam therapy is prescribed for the superficial neoplasms irradiation [1]. In radiation therapy, special devices called boluses are used to create a complex depth distribution of the absorbed dose. These devices, which follow the contours of the patient body, are located on the surface of the skin in the treatment field. Application of such devices allows reducing the dose value to healthy tissues located near the tumor [2].
In modern clinical practice the hydrogel and paraffin are widely used for boluses creation as standard approach. However, the first material is limited by the simplicity of the form, and the second is too brittle and fragile, and therefore its use is limited to several sessions of radiation therapy.
In this research, it is proposed to make a plastic bolus for electron beam deep dose distribution formation by 3D-printing methods. Today, 3D-printing techniques make it possible to create a product of the required shape with high accuracy and strength individually for each patient.
Experimental studies of the therapeutic electron beam deep dose distribution formation by hydrogel, paraffin and 3D-printed plastic bolus were carried out. It was been shown that a 3D-printed plastic bolus is as good as common devices in terms of its ability to shape the therapeutic field.
This work is supported by the Russian Science Foundation, project No. 19-79-10014-П.

References

1. Stuchebrov S. G. et al. Influence of 3D-printed collimator thickness on near-the-edge scattering of high-energy electrons //Journal of Instrumentation. –2020. –V. 15. –№. 04. –P. C04023.
2. Vyas V. et al. On bolus for megavoltage photon and electron radiation therapy // Medical Dosimetry. –2013. –V. 38. –№. 3. –p. 268-273.

Primary authors: BUSHMINA, Elizaveta; Dr BULAVSKAYA, Angelina (Tomsk Polytechnic University, Tomsk, Russian Federation); GRIGORIEVA, Anna (Tomsk Polytechnic University); Dr MILOICHIKOVA, Irina (1) Tomsk Polytechnic University, Tomsk, Russian Federation. 2) Cancer Research Institute of Tomsk National Research Medical Center of the Russian Academy of Sciences, Radiotherapy Department, Tomsk, Russian Federation.); Dr STUCHEBROV, Sergei (Tomsk Polytechnic University, Tomsk, Russian Federation.)

Presenter: BUSHMINA, Elizaveta

Session Classification: Applied Research

Track Classification: Applied Research