Classical Kaposi's sarcoma treatment with helical tomotherapy: impact of polyurethane foam cushion

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OBJECTIVES

Classical Kaposi's sarcoma (KS) usually involves the skin of the lower extremities and was generally treated with large parallel and opposed photon beam. To spare muscles and bones, a treatment with Helical Tomotherapy (HT) was performed. Because of the skin involvement two polyurethane foam cushions (PFC) were applied as immobilization devices and as bolus material, in a "shell" configuration.

METHODS

A 92 years old man with a KS referred to our center to be treated to both legs (from limbs to fits). The patient was asked to positioning himself as comfortably as possible in to a polyurethane foam cushion. After the complete solidification of the polyurethane, another cushion was used to cover up the upper surface. Both cushions were positioned as close as possible to the surface, in order to act as a bolus material. CTV included the area of macroscopic disease, visible in CT, including skin and edema, avoiding muscle and bones. PTV was created by 5mm expansion in all direction from the CTV. A core structure distant 2mm from the PTV was created for each leg and completely blocked in order to force HT to deliver only tangential beams to the PTV. The prescribed dose (D_p) was 60Gy in 30 fractions to the PTV_{eval} (PTV contracted 2mm from skin), according to guidelines [1]. Because of the length of target (1m) a large field width (5.02cm), pitch of 0.430, and modulation factor of 2.0 were used. MVCT was performed daily before treatment. The irradiation time resulting in 15 minutes and the time required for the positioning and the MVCT was about 20 minutes. The surface doses was measured on the first session by means of EBT3 films: 24 films (2cmx2.5cm) were placed all over the skin of the legs and feet.

RESULTS

The minimum ($D_{98\%}$), maximum ($D_{2\%}$) and mean doses (D_{mean}) to the PTV_{eval} were respectively 56.4Gy, 62.8Gy, 60.0Gy with a Homogeneity Index of 0.108. The D_{mean} of the core region was 43.0Gy. The density of the polyurethane foam cushion was measured from the CT and resulted in 0.0066 g/cm^3. The skin region (extended 2mm inside the body contour) received a D_{mean} of 58.9Gy (98% of D_p) and a $D_{98\%}$ of 57.0Gy (82% of D_p). The measured doses ranged from 83% (in the instep region) end 94% (on the central and larger region of the thigh) of D_p with a mean value of 88% (1.75Gy).

CONCLUSIONS

In KS lower extremity irradiation, the combination of a core blocked HT and the PSC shell offered an adequate dose coverage on the whole target, including the skin, spearing at the same time the muscles and skeleton.

REFERENCES:

[1] London Cancer – Skin Cancer Radiotherapy Guidelines, August 2013, lead autor: Girija Anand

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