Dosimetry of 125I Gilia Site brachytherapy using Monte Carlo method

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Purpose: One of the applications of 125I, is used to treat brain tumors by injection technique of radioactive liquid inside the balloon Gilia Site in the former site of the tumor which has been surgically implanted. In this treatment the activity utilized is in the range of several hundred mCi, so patients and medical personnel dosimetry in this technique is very important.

Materials/methods: Dose in the tumor and in the sensitive tissue around that in the period of treatment was calculated when the balloon containing iodine is placed in the tumor. A Glia Site balloon was considered in diameter of 1.5 cm which filled 125I liquid source. The simulations in this research are carried out at all stages with the MCNP code and the VIP phantom was used (figure 1).

Results: We obtained the duration of treatment to reach the prescribed dose (60Gy in 2mm depth) to the tumor, which for the activity 200mCi was about 8.4 days. In figure 2, iso-doses were shown that related to the balloon of 125I Liquid in the head. Absorbed dose for healthy tissue in white matter, gray matter and eye lens were calculated 9.12, 5.07 and 0.51 mGy, respectively.

Conclusions: Glia Site brachytherapy with 200-300mCi of 125I Liquid can be obtained the prescribed dose into the tumor.

Key words: brachytherapy, GliaSite, Dosimetry, 125I, brain tumor, Monte Carlo

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