Active raster scanning with carbon ions: reirradiation in patients with recurrent skull base chordomas and chondrosarcomas.

To evaluate the safety and efficacy of reirradiation with carbon ions in patients with relapse of skull base chordoma and chondrosarcoma. Reirradiation with carbon ions was performed on 25 patients with locally recurrent skull base chordoma (n = 20) or chondrosarcoma (n = 5). The median time between the last radiation exposure and the reirradiation with carbon ions was 7 years. In the past, 23 patients had been irradiated once, two patients twice. Reirradiation was delivered using the active raster scanning method. The total median dose was 51.0 GyE carbon ions in a weekly regimen of five to six fractions of 3 GyE. Local progression-free survival (LPFS) was evaluated using the Kaplan-Meier method; toxicity was evaluated using the NCI Common Terminology Criteria for Adverse Events (CTCAE v.4.03). The treatment could be finished in all patients without interruption. In 80% of patients, symptom control was achieved after therapy. The 2-year-LPFS probability was 79.3%. A PTV volume of 51 GyE was associated with a superior local control rate. The therapy was associated with low acute toxicity. One patient developed grade 2 mucositis during therapy. Furthermore, 12% of patients had tympanic effusion with mild hypacusis (grade 2), while 20% developed an asymptomatic temporal
lobe reaction after treatment (grade 1). Only one patient showed a grade 3 osteoradionecrosis. Reirradiation with carbon ions is a safe and effective method in patients with relapsed chordoma and chondrosarcoma of the skull base.

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