

Hypofractionated Stereotactic Radiosurgery (hSRS) as Salvage Treatment of Brain Metastases

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Objective(s): The introduction of hypofractionated stereotactic radiosurgery (hSRS) extended the treatment modalities beyond the well-established single fraction stereotactic radiosurgery (SRS) with its limitations of tumor size > 3cm and proximity to critical structures (e.g. optic system, brainstem etc.). However, clinical data regarding the efficacy and side effects applying hSRS for the treatment of brain metastases (BM) are limited.

Methods: For this single centre retrospective analysis we included all patients who underwent Cyberknife® hSRS from 2014 – 2018. Following a prospective protocol, we applied a total surface dose of 27 Gy in 3 fractions. To simplify the treatment management treatment was extended also to additional small or not eloquently located BM as well as to pre-irradiated BMs (i.e. post WBRT, SRS, Brachytherapy). Patient data were analyzed in terms of local control (LC) followed by MRI, progression free survival (PFS), overall survival (OS) and treatment related early and late complications (rated by using the Common Terminology Criteria for Adverse Events, CTCAE, v4.03).

Results: We identified 34 patients with 75 BM (median diameter 2.0 cm; range 0.4 - 4.3 cm). Main indications were large tumor size in 50% (n=17), eloquent location in 32.4% (n=11), and large deep Aseated BM recurrent after irradiation in 14.7% (n=5) of the cases.

Median follow-up (FU) was 8 months (range 2–28). The actuarial LC rates were 98% at 3 and 6 months and 78.6% at 12 months. The median PFS was 38%, 32% and 15% whereas OS was 65%, 47% and 28% after 3, 6 and 12 months, respectively. Patients with a Karnofsky performance score (KPS) \geq 70 had a significantly ($p < 0.01$) longer OS (14 months, range 8.8 – 19.2) compared to patients with a KPS < 70 (OS: 2 months, range: 0.7 – 3.3).

CTCAE grade 1 - 3 were observed in 12% (n=4/34). Early complications at the time of treatment were present in two cases (6%).

Conclusion(s): hSRS suits as salvage treatment of cerebral metastases and is reasonably tolerated. While local control rates are promising, PFS and OS are poor in context of the well-known bad prognosis of carcinoma patients in stadium IV with large or eloquently located brain metastases.