

# Brainstem metastases

Brainstem metastases comprise fewer than 7% of all [brain metastases](#).

## Treatment

[Brainstem metastases treatment](#).

### Hypofractionated stereotactic radiotherapy

The long-term efficacy and complications of hypofractionated stereotactic radiotherapy (hSRT) to metastases involving the brainstem are not well reported. Our objective is to review the results of metastases intrinsic to or abutting the brainstem treated with hSRT. Patients treated with hSRT in 5 fractions at our institution from 2016 to 2020 were retrospectively reviewed. Varian Eclipse v13.7 TPS was used for treatment planning. MRI images were fused with CT images acquired at the time of simulation, and contoured structures include the brainstem, the GTV, and a 2 mm margin was used to generate the PTV. MR imaging was performed at 3-month intervals. Survival was assessed at the last available follow-up; tumor control was assessed at 6 and 12 months and toxicity was assessed based on the Radiation Therapy Oncology Group grading system at regular follow-up. Twenty patients were treated with 5 fraction treatment dose plans ranging from 20 Gy - 31.25 Gy. GTV mean volume was 3.5 cc  $\pm$  4.3 cc (range 0.1 cc - 18.9 cc). The median overall survival was 6.5 months (range: 1 to 29 months). The twelve-month tumor control rate was 80%. Toxicity was generally mild, with only one patient demonstrating Grade 3 toxicity. Two patients had radiographic progression, but neither required surgical intervention. In our series, hSRT resulted in similar rates of survival, tumor control, and toxicity as compared with published single fraction series. Dose escalation of lesions adjacent to the brainstem can be considered and maybe more feasible with a hypofractionated regimen of 5 fractions <sup>1)</sup>.

## Outcome

They are associated with the worst prognosis with a survival rate of 1–6 months without directed therapy <sup>2) 3)</sup>

<sup>1)</sup>

Ortiz M, Herbert J, Hika B, Biedermann G, Phillips L, Wexler A, Litofsky NS. Linac-based hypofractionated stereotactic radiotherapy for metastases involving the brainstem. *J Clin Neurosci*. 2022 Apr;98:235-239. doi: 10.1016/j.jocn.2022.01.030. Epub 2022 Feb 23. PMID: 35217503.

<sup>2)</sup>

Huang CF, Kondziolka D, Flickinger JC, Lunsford LD. Stereotactic radiosurgery for brainstem metastases. *J Neurosurg*. 1999 Oct;91(4):563-8. doi: 10.3171/jns.1999.91.4.0563. PMID: 10507375.

<sup>3)</sup>

Trifiletti DM, Lee CC, Shah N, Patel NV, Chen SC, Sheehan JP. How Does Brainstem Involvement Affect Prognosis in Patients with Limited Brain Metastases? Results of a Matched-Cohort Analysis. *World Neurosurg*. 2016 Apr;88:563-568. doi: 10.1016/j.wneu.2015.10.089. Epub 2015 Nov 10. PMID: 26555507.

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