Brainstem metastases treatment

Brainstem metastases present clinicians with unique clinical challenges in symptom management and treatment. No comprehensive review summarizing the management of brainstem metastases exists [1)].

Radiation oncologists play a central role in the treatment of brainstem metastases due to reliance on SRS. Dose and fractionation of brainstem SRS remain largely institution-dependent. The field would benefit from inclusion of brainstem metastases in prospective trials of SRS and studies of adverse effects of salvage WBRT after prior SRS of brainstem metastases [2)].

Stereotactic radiosurgery for Brainstem metastases.

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 treatedwith 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 ± 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 [3)].

[1)], [2)]
Lee JY, Cunningham DA, Murphy ES, Chao ST, Suh JH. Optimal management of brainstem metastases: a narrative review. Chin Clin Oncol. 2022 Apr;11(2):15. doi: 10.21037/cco-21-146. PMID: 35534793.
[3)]
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.