



Neoadjuvant Stereotactic Radiotherapy Followed by Surgical Resection for Brain Metastases

Hideyuki Harada, MD | Tsuyoshi Onoe, MD | Koichi Mitsuya, MD
Shizuoka Cancer Center Hospital, Nagaizumi, Japan

Purpose

Surgical resection with or without postoperative radiation therapy for large brain metastases faces challenges such as local recurrence, leptomeningeal dissemination and radiation necrosis. As a new strategy to overcome these challenges, our hospital initiated a new treatment regimen in 2019 involving neoadjuvant stereotactic radiotherapy followed by surgical resection. In the Neotactics trial, a single-arm Phase 2 study of preoperative SRT, its efficacy and safety were reported (Mitsuya K, et al; ASCO2026). In this study, we conducted a retrospective analysis of a consecutive case series.

Materials and Methods

We included patients who underwent preoperative stereotactic radiotherapy was administered prior to surgical resection for metastatic brain tumors diagnosed preoperatively between July 2019 and March 2025. We retrospectively reviewed medical records to assess post-treatment local recurrence, intracranial recurrence, adverse events, and survival. The data cutoff date was March 31, 2026.

Results

Surgical resection was performed in 71 patients and this analysis included 62 patients after excluding five patients for which postoperative follow-up was not conducted at our institution, three patients diagnosed as non-metastatic brain tumors based on postoperative pathological examination; two were diagnosed with glioblastoma, one was diagnosed with brain necrosis resulting from previous radiotherapy and one patient with evidence of dissemination to inner ear at the start of radiation therapy. Recurrence at the surgical site occurred in 4 patients (6.5%), recurrence of lesions treated with stereotactic radiotherapy occurred in 2 patients (3.2%) and new brain metastases developed in 18 patients (29%). Leptomeningeal dissemination occurred in four patients (6.5%). Symptomatic brain necrosis was observed in one patient (1.6%). The 1-year overall survival ratio was 54%.

Conclusion

Preoperative stereotactic radiotherapy combined with surgical resection demonstrated excellent local control, suppression of leptomeningeal dissemination and acceptable toxicity. An evaluation through a randomized controlled trial comparing preoperative fractionated SRS and postoperative SRS is warranted.
(This abstract was presented in the 11th Japan-Taiwan Radiation Oncology Symposium, Kobe, Japan; September 5th, 2026)

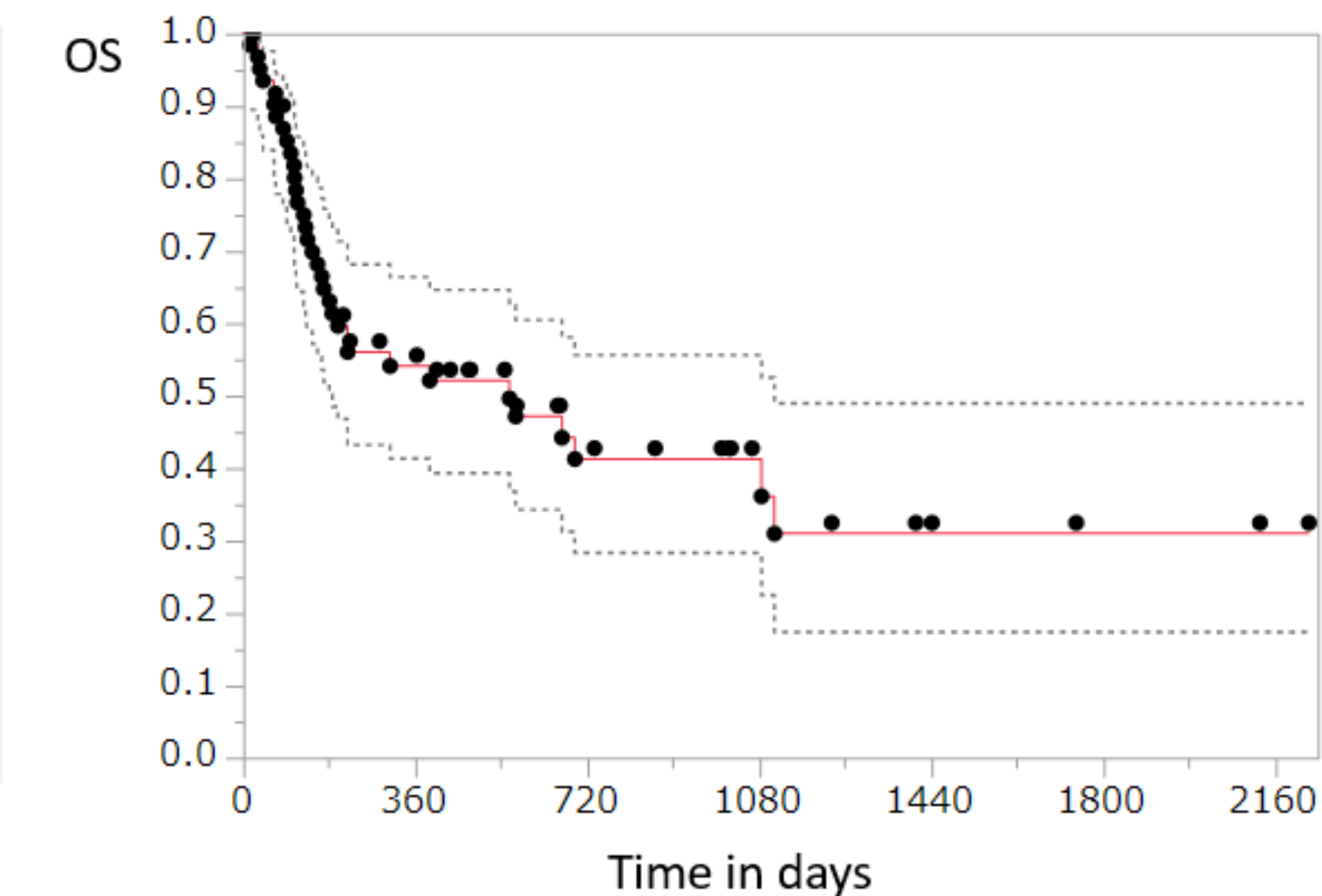


Figure 1 Overall survival