Staged SRS with Ommaya Reservoir Aspiration for Large Cystic Brain Metastases: Long-term Safety and Efficacy

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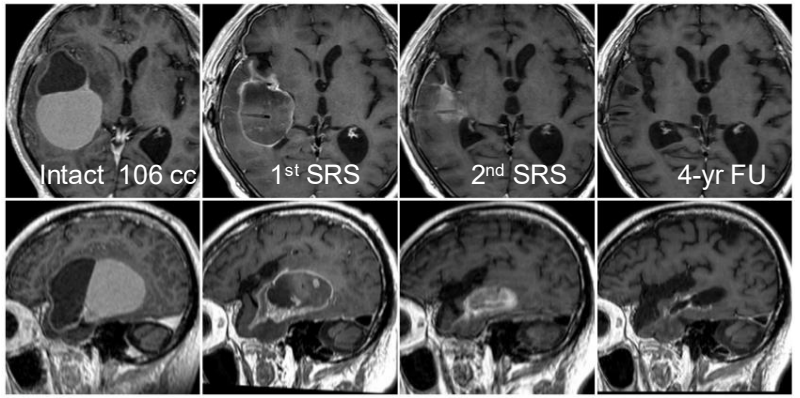
Shoji Yomo, M.D., Ph.D. (ORCID ID: 0000-0001-7426-7654)
Division of Radiation Oncology, Aizawa Comprehensive Cancer Center, Aizawa Hospital, Matsumoto, Japan

OBJECTIVE

- Management of **large cystic brain metastases (CBMs)** is challenging due to mass effect and radiation risks.
- This study evaluates the feasibility and long-term outcomes of **Ommaya reservoir (OR) aspiration** followed by **staged stereotactic radiosurgery (S-SRS)**

METHODS

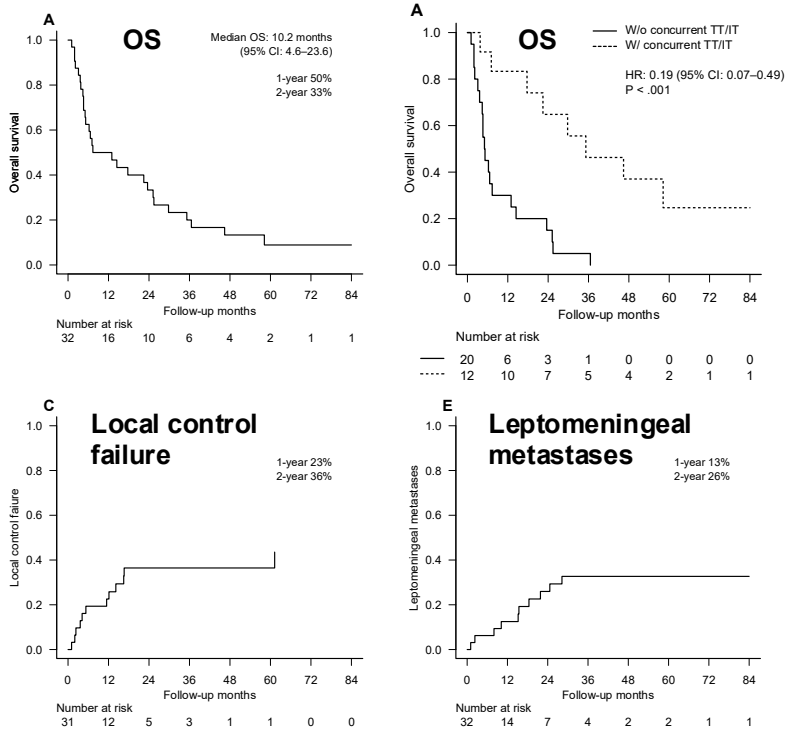
- **Cohort:** 32 consecutive patients (34 tumors) with large CBMs (>10 mL post-aspiration or in eloquent areas).
- **Median Initial Volume: 34.1 mL** (IQR 22.9–53.8).
- **S-SRS Protocol:** 24–30 Gy delivered in **2 stages**, with a 3–4 week interval.
- **OR Management:** Immediate aspiration before each SRS session to maximize target reduction.

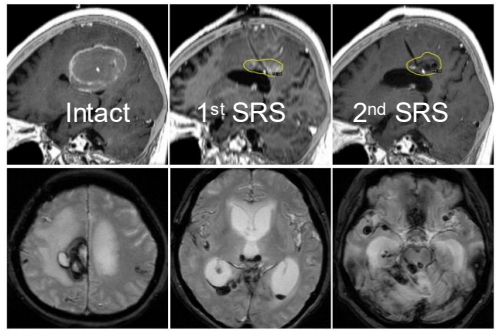


T1 Gd-enhanced MRI changes in a representative case. Top row: axial images; bottom row: sagittal images. MRI at 4 years showed sustained local tumor control.

RESULTS

- **Median volume reduction: 62%** (IQR 42–73) and **82%** (IQR 66–87) at each S-SRS session relative to intact CBMs.
- **OS:** One- and 2-year rates after S-SRS were **50% and 33%**, with a median survival of **10.2 months**.
- Concurrent **targeted therapy (TT)/immunotherapy (IT)** was the only independent factor associated with improved OS (**HR 0.31**, p < .001).
- **Local control failure:** cumulative 1- and 2-year rates were **23% and 36%,** respectively.
- **Leptomeningeal metastasis:** cumulative 1- and 2-year rates were **13% and 26%**, respectively.
- **One serious adverse event (CTCAE Gr.5)** occurred due to ventricular perforation caused by the catheter tip (right column).





MRI changes in a case complicated with ventricular perforation caused by the catheter tip. Top row: T1 Gd-enhanced sagittal images fused with CT. Bottom row: T2* axial images.

CONCLUSIONS

- OR aspiration, followed by S-SRS, is **an effective, minimally invasive option** for large CBMs.
- Concurrent TT/IT was associated with improved survival, but long-term disease control remains challenging.

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