Treatment Outcome of Stereotactic Radiosurgery in the Small and Medium-sized Cystic Metastatic Brain Tumors

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Purpose

The purpose of this study is to evaluate tumor control outcomes in small- and medium-sized cystic metastatic brain tumors after stereotactic radiosurgery.

Patients & Methods

- from Jan, 2013 to Dec, 2023 (11 years)
- Selection with Image Review
  - *metastatic brain tumor(s) with **ring-enhancement** in MRI*
  - *meaningful size more than **1cm** in diameter*
  - *underwent SRS as the **first treatment***
  - *radiologically **followed up***
  - ***two authors' agreement***
- 111 tumors in 85 patients
- Patients' mean age: 64.7 years
- M:F =58: 29
- **Primary cancer types**
  - non-small cell lung cancer (N= 69)
  - small cell lung cancer (N= 22)
  - breast cancers (N= 10)
  - others (N= 10)

Gamma Knife radiosurgery (GKRS)

- mean tumor volume: 4.28 cc (range: 0.08–18.28)
- median prescription dose: 20.0 Gy (range: 14–25)

Results

- Inner cystic content volume: 0.02 - 7.76 cc
  (mean & median: 1.28 & 0.64 cc, respectively)

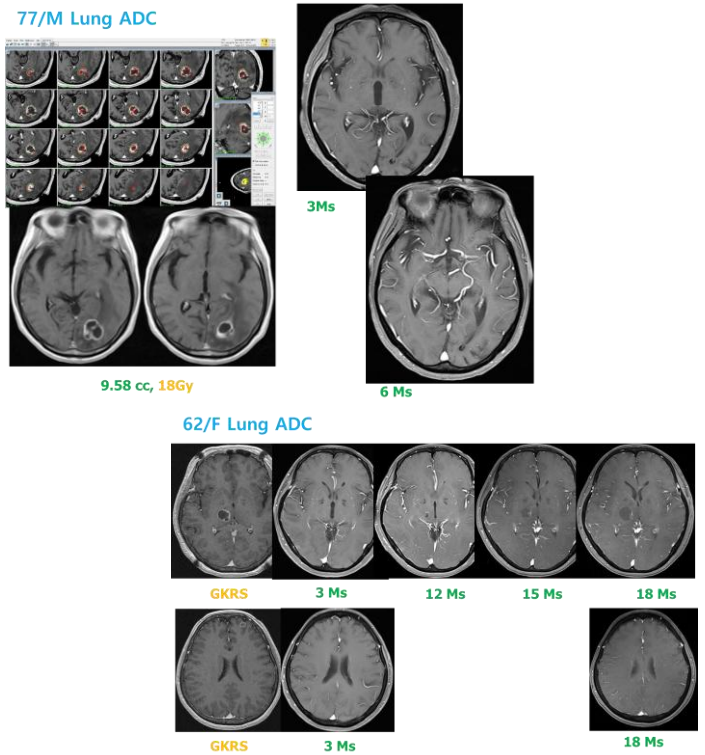
- Inner cystic content volume proportion: 5.68 - 63.96%
  (mean & median: 26.3 & 25.54%, respectively)

-Tumor control rate: 79.1% (148 out of 187)
-Progression-free survival
(Mean: 239 days & Median:153 days)

Prognostic factors

- Tumor volume (less than 5cc vs. more)	**P=0.022**
- Tumor volume (less than 10cc vs. more)	P=0.503
- Prescription dose 20cc vs. lower	P=0.184
- Prescription dose 18cc vs. lower	**P=0.025**
- Lung cancer primary vs. others	**P=0.002**
- NSCLC vs. others	**P <0.001**
- SCLC vs. others	**P =0.003**
- Early dramatic volume reduction	P=0.116
- Inner cystic volume proportion more than 25% vs. less	P =0.530

Case Illustrations



Conclusion

We observed similar or slightly inferior tumor control outcomes in ring-enhancing metastatic brain tumors following SRS.

However, the prognostic factors related to tumor control showed similar trends compared to those observed in general metastatic brain tumors. Further investigations using additional radiological parameters and AI-based analysis are warranted.