

Self-Assessment Module
2017 ASTRO Annual Meeting

**EDU44 Managing Brain Metastases in the 21st Century: Treatment Options and
Case Discussions**

Drs. Chang, Fiveash, Knisely, and Yamada

1. In the radiosurgical treatment of a single brain metastasis, what is the 1-year local control rates for tumors treated with 24 Gy, 18Gy, and 15 Gy approximately?
- a) All above 85%
 - b) All below 70%
 - c) 85%, 85%, 45%
 - d) 85%, 50%, 45%
 - e) 85%, 30%, 20%

Correct Answer: d.

Reference:

Vogelbaum M et al. J Neurosurgery 104(6):907-12, 2006

Feedback:

202 patients with 375 lesions were treated with SRS at Cleveland Clinic between 1997-2003. The 1-year local control by margin dose was 24 Gy: 85% (78-92%), 18 Gy: 49% (30-68%), and 15 Gy: 45% (23 – 67%)

- - - End of Question 1 - - -

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2. In the NCCTG N0574 (Alliance) trial of a phase III randomized trial of WBRT in addition to SRS in patients with 1 to 3 brain metastases, the primary endpoint was cognitive progression at 3 months. Which of the following approximates the cognitive progression at 3 months for SRS versus SRS + WBRT?
- a) 30% versus 30% (P= NS)
 - b) 55% versus 35% (P= 0.02)
 - c) 65% versus 90% (P= 0.0007)
 - d) 80% versus 100% (P= 0.03)
 - e) 0% versus 100% (P=0.001)

Correct Answer: C

Reference:

Brown PD et al. JAMA 2016;316(4): 401-409.

Feedback:

The primary endpoint was cognitive progression at 3 months showing SRS vs. SRS+WBRT was 63.5% versus 91.7% (p=0.0007). The cognitive progression at 6 months was: SRS 77.8% vs. SRS +WBRT 97.9%, p =0.032.

- - - End of Question 2 - - -

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3. Which agent is most likely to cause severe skin toxicity in a patient receiving concurrent brain radiation?
- a) Vemurafenib (BRAF inhibitor)
 - b) Bevacizumab (mAb anti-VEGF)
 - c) Trastuzumab (mAb anti-HER2)
 - d) Erlotinib (EGFR inhibitor)
 - e) Levetiracetam (anti-seizure)

The correct answer is “a”.

Feedback:

BRAF inhibitors have been associated with severe skin toxicity in patients undergoing concurrent wide field radiation therapy such as whole brain RT. Although EGFR inhibitors are associated with a rash, the concurrent use of EGFR inhibitors with both whole brain RT and radiosurgery is clinically feasible.

Reference:

Wallach et al, Practical Radiation Oncology (2014) 4, e213-e216

- - - End of Question 3 - - -

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4. 60 yo male is diagnosed with a T3N2M1 adenocarcinoma of the lung (EGFR wildtype). There is a single metastasis to the right temporal lobe and you have recommended single fraction brain radiosurgery. Which is the **strongest** predictor of grade 3 or greater radiation necrosis?
- a) Concurrent use of anti-PD1 inhibitor
 - b) Tumor diameter over 3 cm
 - c) Fewer than three week interval before starting carboplatin
 - d) Patient not on oral steroids at the time of radiosurgery
 - e) Heterogeneity of radiosurgery plan >120%

The correct answer is “b”.

Feedback:

Radiosurgery toxicity is strongly determined by tumor diameter (or volume). The other factors listed are either not associated with an increased risk or the increased risk is very small.

Reference:

Int. J. Radiation Oncology Biol. Phys., Vol. 47:291–298, 2000 and Vol. 34:647-654, 1996
Blonigen et al. *IJROBP*, 77(4), 996–1001.

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5. Regarding hypofractionation for treating brain metastases, which of the following is true?
- a) Lesions greater than 3cm in diameter may have improved local control with hypofractionation over single fraction radiosurgery
 - b) Lesions greater than 2cm should never be treated with single session radiosurgery
 - c) The rate of radionecrosis is the same regardless of the fractionation schedule for larger lesions
 - d) The risk of radionecrosis is less than 5% for larger lesions when hypofractionated radiotherapy is given
 - e) For lesions greater than 2cm, whole brain radiation is the preferred treatment

Answer: a.

Feedback:

According to Minniti et al., the 12 month local control rate for lesions 3cm or larger was 73% with hypofractionation, compared to 54% for single session radiosurgery.

Reference:

[Minniti G¹](#), [Scaringi C²](#), [Paolini S³](#), [Lanzetta G³](#), [Romano A⁴](#), [Cicone F⁵](#), [Osti M²](#), [Enrici RM²](#), [Esposito V³](#). Single-Fraction Versus Multifraction (3 × 9 Gy) Stereotactic Radiosurgery for Large (>2 cm) Brain Metastases: A Comparative Analysis of Local Control and Risk of Radiation-Induced Brain Necrosis. [Int J Radiat Oncol Biol Phys.](#) 2016 Jul 15;95(4):1142-8. doi: 10.1016/j.ijrobp.2016.03.013. Epub 2016 Mar 19

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