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Trends in Radiographic Follow-up of Cerebral Metastases Treated With Gamma Knife as a Predictor of Treatment Failure

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Introduction

Radiographic outcomes for patients with cerebral metastases treated with gamma knife radiosurgery (GK) can be highly variable. The behavior of recurrent brain metastases following gamma knife surgery has not yet been described.

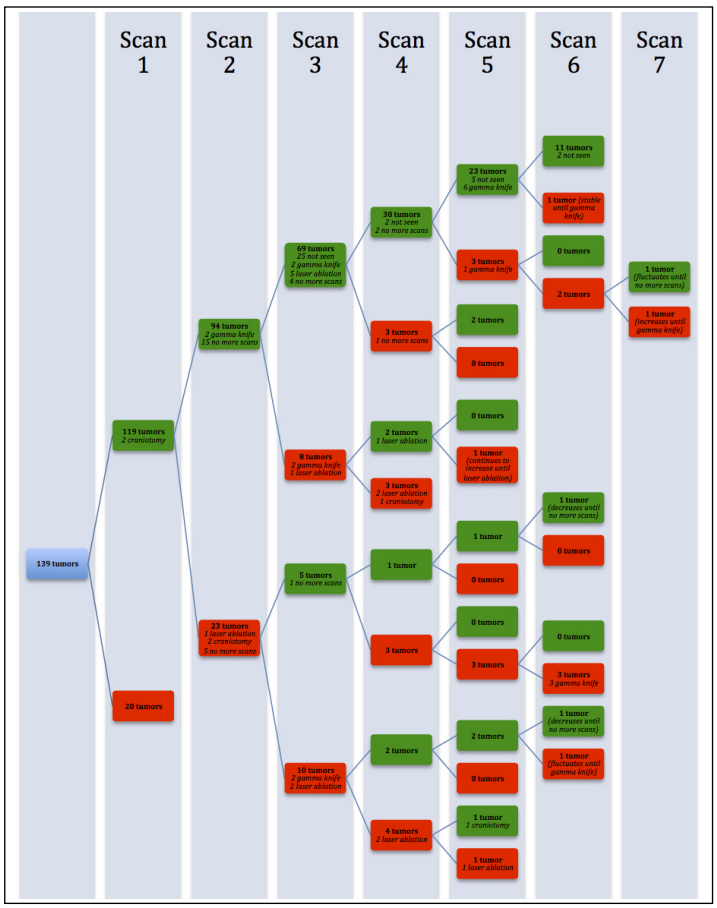
Methods

139 brain metastases from 61 patients that underwent gamma knife surgery were examined via a retrospective chart review of the radiographic follow-up.

Results

Of the 139 tumors examined, 20 tumors (14.3%) failed GK treatment based on continued radiographic progression on the first follow-up MRI. Of the remaining 126 tumors, 85.6% demonstrated decreased or stable size on the first follow-up scan. Of the lesions which remained stable or decreased in size over 2 consecutive scans, only 10.6% went on to demonstrate radiographic recurrence requiring additional intervention over the surveillance period of up to 7 follow-up MRIs. Of the lesions which showed an increase in size on the second follow-up MRI, 60.1 % went on to demonstrate radiographic recurrence requiring additional intervention over the surveillance period.

The figure below shows the tumor behavior with each subsequent follow-up scan.



Green = Decrease/Stable
Red = Increase

Conclusions

Patients who demonstrate radiographic increase in lesion size by the second consecutive follow-up MRI are more likely to require additional intervention (craniotomy, repeat GK, laser ablation) compared to patients who show stable or decreased radiographic lesion size on two consecutive follow-up scans.

Learning Objectives

By the conclusion of this session, participants should be able to:
1) Describe long term radiographic changes in cerebral metastases treated with GK.
2) Discuss in small groups the clinical implications of radiographic growth in post-treated tumors.
3) Identify the role of early intervention based on radiographic change.

References