

# Efficacy and Safety of Cyberknife Radiosurgery in Elderly with Brain Metastases

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**Objective(s):** Stereotactic radiosurgery (SRS) has been increasingly applied to solitary and even multiple (1-10) cerebral metastases instead of whole brain radiation (WBRT) to reduce the neurotoxicity. Furthermore, due to the improved systemic therapies of the primary diseases the number of retreatments by radiosurgery for local progress or for new cerebral lesions grow. The aim of our study was the analyze the efficacy and safety of Cyberknife radiosurgery in elderly.

**Methods:** We retrospectively identified all the patients  $\geq 65$  years with brain metastases who were treated by SRS using Cyberknife (CK) at our institution since 2011. Subsequently, we analyzed clinical data including primary diseases, other treatments and adverse effects. We mainly focused on the local therapy effect based on imaging follow up and on the safety of the treatment. Kaplan Meier analyses for local-progression free and overall survival were performed.

**Results:** We identified 104 patients fulfilling the criteria at the first CK-SRS with 232 lesions in 126 CK sessions. Overall, 54% and 17% of the patients were between 70-80 and  $\geq 80$  years old, respectively. The three most frequent primary tumors were lung (45%), melanoma (17%) and mamma and kidney (10% each). In 33% of the CK-SRS multiple lesions were treated with a range of 2-8 lesions and 12.5% (13/104) were treated repeatedly by CK. 13% of the patients underwent a whole brain radiation therapy before or after CK (64% vs. 21.4%, respectively). KPS remained stable in 93.4%, while only 1.8% deteriorated by  $\geq 10$  points. Only 1 patient (0.9%) developed a new neurological deficit. The median planning target volume (PTV) for the lesions was 0.78 mm<sup>3</sup> (range: 0.02-26.8) with a median prescription dose (PD) of 21 Gy (range: 12-30). 90% of the lesions were treated by a single fraction. The estimated overall survivals at 3-,6-,and 12-mos. were 71%, 48% and 29%, respectively. The estimated local tumor progression-free interval at 12-,24-,and 36-mos. were 98%, 91% and 37%, respectively.

**Conclusion(s):** Radiosurgical treatment of the elderly patients with brain metastases represents a safe treatment option with sufficient local control rates. The role of combining SRS and immunotherapy for brain lesions and the limits of retreatments have to be evaluated in a prospective study.