

Modern Gamma Knife Radiosurgery Of Vestibular Schwannomas

Mikhail Chernov, Motohiro Hayashi, Yoshihiro Muragaki, Takakazu Kawamata

*Faculty of Advanced Techno-Surgery and Department of Neurosurgery,
Tokyo Women's Medical University, Tokyo, Japan*

Objectives: Nowadays, approximately one third of patients with vestibular schwannomas (VS) receive radiation treatment, mainly by means of Gamma Knife surgery (GKS). The objective of this study was analysis of oncological and functional results of GKS performed according to modern treatment standards in cases of sporadic VS.

Methods: The study is based on analysis of 126 patients with sporadic VS, who underwent GKS and were followed at least 2 years thereafter. Treatment was done according to the concept of robotic Gamma Knife microradiosurgery, which is based on precise irradiation of the lesion, sparing adjacent structures, and delivery of the high radiation energy to the target. The mean marginal dose was 11.5 Gy (range, 11-12 Gy).

Results: At 3 years of follow-up, tumor shrinkage, stabilization, and increase in volume were marked in 73%, 23%, and 4% of cases, respectively. All progressing lesions spontaneously stabilized later on and did not require additional management (radiological control, 96%; oncological control, 100%). In 3% of patients, transitory impairment of the facial nerve function was marked; however, neither its permanent dysfunction nor trigeminal neuropathy attributed to radiosurgery was noted. Overall, in 77% of patients with serviceable hearing before treatment it was preserved 3 years thereafter, and in 57% at the time of last follow-up (median, 56 months; maximum 99 months).

Conclusions: GKS performed according to modern treatment standards provides effective and safe management of sporadic vestibular schwannomas, and allows preservation of serviceable hearing on the side of the tumor in more than half of patients within the median-range follow-up. Up to date there is no any formidable data to prove that fractionated irradiation in such cases provides better functional results. In cases of large VS, combined treatment with preplanned partial surgical resection and subsequent GKS provides much better functional outcomes in comparison to either treatment alone.