

## Combined Approach for Large Vestibular Schwannomas: Planned Subtotal Resection Followed by Gamma Knife Radiosurgery in a Consecutive Series of 40 Cases

Marc Levivier MD, PhD; Constantin Tuleasca MD; Mercy George; Luis Schiappacasse; Raphael Maire; Roy Thomas Daniel  
MCh

### Introduction

Gamma Knife radiosurgery (GKRS) allows optimal functional results in small- and medium-size VS, but cannot be used upfront in large vestibular schwannomas (VS) because of the high rate of volume-related side effects.

### Methods

To use a combined approach with microsurgery (retrosigmoid approach with intraoperative neuromonitoring ) and GKS in patients with large VS. Patient characteristics, surgical and dosimetric features and outcome were collected prospectively.

### Results

A consecutive series of 40 patients was treated since 2010. The mean presurgical tumor volume was 12 cm<sup>3</sup>. All cases had normal facial nerve function (HB I) before surgery, except for one who was in HB IV. Postoperative status showed normal facial nerve function in all patients. In a subgroup of 22 patients in which cochlear nerve preservation was attempted at surgery (patients with residual hearing before surgery), 21 (95.4%) retained residual hearing. Among them, 16 patients had normal hearing (Gardner-Robertson class 1) before surgery, and 13 (81.2%) retained normal hearing after surgery. The mean duration between surgery and GKRS was 6.2 months (4-13.9, median 6 months). The mean tumor volume at the time of GKRS was 3.6 cm<sup>3</sup>, which corresponds to a mean residual volume of 31.4% of the pre-operative volume. There was a tendency towards larger postoperative residual volume in patients with attempt to cochlear nerve preservation. The mean marginal prescription dose for GKS was 12 Gy. Following GKRS, there were no new neurological deficits, with facial and hearing functions remaining identical to that after surgery. The mean follow-up after surgery was 31 months (range 3-72)

### Conclusions

Our data suggest that the management of large VS with planned subtotal resection followed by GKRS may yield an excellent clinical outcome with respect to retaining facial and cochlear nerve functions. Our results with this approach are comparable to those obtained with GKRS alone in small- and medium-size VS.

### Learning Objectives

Participants should be able to discuss and compare the different therapeutical options for the management of vestibular schwannomas, including the use of combined approach in large tumors.

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