



## Title:

### **Towards zero facial palsy in management of large acoustic neuroma: combining the merits of microsurgery and radiosurgery**

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## Abstract:

### Object

Despite advances in microsurgical techniques, complete surgical resection of large acoustic neuroma is still associated with significant morbidity related to facial palsy. By modifying the techniques of microsurgery and combined it with planned post-operative radiosurgery, the authors aimed to reduce the incidence of permanent facial nerve palsy to near zero in a prospective study.

### Methods

Between 2000 and 2011, 54 large (Koo's classification stage 4) acoustic neuromas (AN), were managed by the senior authors with planned microsurgery (MS) followed by Gamma Knife surgery (GKS). Mean tumor volume before MS was 17.6 cc (4.9 - 44.5). Mean follow up time was 70 months with minimum 3 years follow up. The authors adhered to a strict surgical protocol: 1. Debulk brain stem side of the tumor until the root entry zone of the trigeminal nerve and the white surface of the pons were visualized. 2. Leave a safe cushion of tumor capsule along the facial nerve that was mapped according to intra-operative EMG monitoring. 3. Internal acoustic meatus was not opened. Between 3 to 6 months after MS, all patients underwent GKS, which was also performed by the same surgeon. Typically 12Gy at 40-50% isodose line was delivered to margin of residual tumour. All patients underwent yearly sequential MRI to assess tumor volume control.

### Results

There was no operative mortality for all 54 patients. Two (3.7%) patients had transient facial weakness, which recovered completely within 3 months. None (0%) suffered from permanent facial palsy. None had other additional cranial neuropathy or added deficits. One patient had a transient CSF leak that required no additional procedure. Mean postoperative tumor volume was 3.8 cc (0.37 - 15.7). Mean tumor volume reduction by MS was 78.4%. Mean tumor volume at 3 years after GKS was 2.8 cc (0.17 - 10.4), a 47% reduction. Mean total reduction tumor volume for combined MS and GKS was 84%. No patient had regrowth of the tumour during the follow-up period.

### Conclusions

The authors believed selective brain stem side debulking, facial nerve preservation strategy and de-vascularization of large ANs facilitated growth control by planned GKS. The results of near zero facial nerve palsy compared favorably with the best published results in terms of functional preservation of facial nerve and eventual shrinkage of the tumor.