



### Stereotactic radiotherapy for the treatment of acoustic neuromas

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#### ABSTRACT

The authors sought to assess the safety and efficacy of stereotactic radiotherapy when using a linear accelerator equipped with a micromultileaf collimator for the treatment of patients with acoustic neuromas.

#### SUMMARY

Fifty patients harboring acoustic neuromas were treated with stereotactic radiotherapy between September 1997 and June 2003. Two patients were lost to follow-up review. Patient age ranged from 20 to 76 years (median 59 years), and none had neurofibromatosis. Forty-two patients had useful hearing prior to stereotactic radiotherapy. The fifth and seventh cranial nerve functions were normal in 44 and 46 patients, respectively. Tumor volume ranged from 0.3 to 19.25 ml (median 2.51 ml). The largest tumor dimension varied from 0.6 to 4 cm (median 2.2 cm). Treatment planning in all patients included computerized tomography and magnetic resonance image fusion and beam shaping by using a micromultileaf collimator. The plan-

ning target volume included the contrast-enhancing tumor mass and a margin of normal tissue varying from 1 to 3 mm (median 2 mm). All tumors were treated with 6-MV photons and received 54 Gy prescribed at the 90% isodose line encompassing the planning target volume. A sustained increase greater than 2 mm in any tumor dimension was defined as local relapse. The follow-up duration varied from 6 to 74 months (median 36 months). The local tumor control rate in the 48 patients available for follow up was 100%. Central tumor hypodensity occurred in 32 patients (67%) at a median of 6 months following stereotactic radiotherapy. In 12 patients (25%), tumor size increased 1 to 2 mm at a median of 6 months following stereotactic radiotherapy. Increased tumor size in six of these patients was transient. In 13 patients (27%), tumor size decreased 1 to 14 mm at a median of 6 months after treatment. Useful hearing was preserved in 39 patients (93%). New facial numbness occurred in one patient (2.2%) with normal fifth cranial nerve function prior to stereotactic radiotherapy. New facial palsy occurred in one patient (2.1 %) with normal seventh cranial nerve function prior to treatment. No patient's pretreatment dysfunction of the fifth or seventh cranial nerve worsened after stereotactic radiotherapy. Tinnitus improved in six patients and worsened in two.

#### CONCLUSION

Stereotactic radiotherapy using field shaping for the treatment of acoustic neuromas achieves high rates of tumor control and preservation of useful hearing. The technique produces low rates of damage to the fifth and seventh cranial nerves. Long-term follow-up studies are necessary to confirm these findings.