

# **ACOUSTIC NEUROMAS CAN BE DETECTED, TREATED EARLY**

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Acoustic neuromas are unusual tumors that affect the nerve responsible for hearing and balance.

This eighth cranial nerve to come off the brain is named the auditory nerve. Cranial nerves come directly off the brain to control a variety of important functions such as sight, smell, hearing, eating and more. Because of the nerve's critical location adjacent to the ear and brain stem (the source of other cranial nerves), neurologic functional impairment of facial strength as well as hearing loss and headaches can be experienced.

Often the hearing loss is insidious so that the tumor may grow to fairly large proportions before being discovered.

Before the days of CT scans (computerized topography) and MRI's (magnetic resonance imaging), tumors were more difficult to diagnose early. Now a relatively simple but sophisticated scan can produce an image allowing physicians to make a presumptive diagnosis painlessly and non-invasively.

Usual symptoms of the disease include loss of hearing, poor balance and facial weakness.

The standard of care has been surgical removal. Occasionally, patients will have bilateral tumors and therefore removal may result in significant neurologic damage.

Some refuse to undergo open surgery and others are felt to be in poor health and are unacceptable for surgery. Side effects of surgery include infections, leakage of spinal fluid and neurologic deterioration.

Hearing loss occurs in essentially all patients undergoing surgery, with complete hearing loss noted in nearly 95% of patients. It is the very unusual patient who retains hearing after surgery.

Furthermore, the vast majority of patients have weakness of the involved side of face after surgery with few actually having neurologic improvement.

Because of the deterioration after open surgery, plus the potential morbidity of the procedure, alternatives have been sought.

One obvious options in stereotactic radiosurgery. This is a method where pencil-thin radiation beams from thousands of angles attack the tumor while protecting the normal surrounding critical brain structures. Using this advanced technique, large doses of radiation can be administered to the acoustic neuroma while minimal effects are produced on the adjacent normal brain.

Stereotactic radiosurgery is performed after a sophisticated head frame is placed on the patient's head. A high resolution contrast CT scan is obtained to delineate the exact location of the tumor as distinct from the normal brain structures.

Intensive physics planning determines the exact radiation attack. After multiple quality assurance procedures, the patient is treated in what is usually a 30 to 60 minute painless, bloodless, anesthesia-less procedure.

Recently reported in the journal, *Cancer*," were 85 patients with acoustic neuromas who received radiosurgery by Flickinger and colleagues.

All patients were evaluated after radiosurgery. No patient died in the subsequent period of time.

Forty-one percent had decrease in size of the tumor while 56% of the patients have stabilization of growth in the tumors. Only two of the 85 patients (3%) had enlargement in the size of the tumor during the subsequent period of observation.

None of the complications associated with open surgery was seen in the patients undergoing stereotactic radiosurgery. This eliminated infections, acute neurologic deterioration or meningitis as side effects of treatment.

Forty-six percent of the patients who had useful hearing prior to radiosurgery still had useful hearing at the time of evaluation. Most nerve damage after radiosurgery was felt to be temporary.

Hearing damage was greater in patients with larger tumors. The smaller tumor, the less likely neurologic function would occur.

Thus, radiosurgery appears to be a viable option for patients with acoustic neuromas. The patients tolerated the procedure exceedingly well with minimal side effects.

Other centers found long-term control rates of 86% in patients with acoustic neuromas treated with radiosurgery.

Furthermore, it appears hearing is more likely to be maintained in patients undergoing stereotactic radiosurgery than open surgery.

Linear accelerator-based stereotactic radiosurgery can treat larger tumors with more homogeneous distribution of radiation than can the older generation gamma knife. The gamma knife has a maximum pencil-thin beam of 1.8 centimeters, while stereotactic radiosurgery using a linear accelerator system can treat beyond 4 centimeter lesions.

Thus, for many reasons, stereotactic radiosurgery may be an appealing choice of patients with acoustic neuromas. It avoids open surgery and associated morbidity and mortality. It certainly does not preclude further surgery, should the patient desire and it may offer dramatic and permanent shrinkage obviating the need for open brain surgery.

New developments have dramatically altered the care of those with acoustic neuromas. While early radiosurgery reports showed the success of the technique, our recent report shows a very high control rate with no damage to the facial or surrounding nerves. Furthermore, many patients have had improvement in their symptoms. Obviously when one develops nerve or brain damage from tumors, it is impossible to predict who will improve or who will not. The appeal of the technique, however, remains. It is totally non-invasive with no pins in the head and therefore no risks of complications from bleeding, skull fracture, tears in the skin or infection. Furthermore, by fractionating treatment surrounding healthy brains are best protected.