

Acoustic neuroma

This factsheet provides information about acoustic neuromas, also known as vestibular schwannomas. If you would like further information, please ask a nurse, doctor, or other healthcare professional involved in your care.

What is an acoustic neuroma?

An acoustic neuroma is a benign (non-cancerous) brain tumour that develops from the lining of the nerve that is responsible for hearing and balance. This nerve is known by a number of names including the acoustic, the vestibular, the auditory and the VIIIth nerve. It is the 8th cranial nerve (of 12 cranial nerves) and has an acoustic branch for hearing and a vestibular branch for balance.

Schwann cells coat and insulate the nerve and tumours arising from these cells are therefore known either as acoustic neuromas or vestibular schwannomas. These tumours are usually slow growing and do not spread to other parts of the body, but they can cause symptoms due to damage or pressure on the affected branch(es) of the nerve and nearby structures, including other cranial nerves.

Acoustic neuromas are most frequently found in 30–60-year-olds though they can occur at any age from 10 years onwards. Bilateral acoustic neuromas (affecting the right and left acoustic nerves) are a defining feature of type 2 neurofibromatosis, which is a rare genetic cause of such tumours.

What are the signs and symptoms of an acoustic neuroma?

Symptoms of an acoustic neuroma can develop gradually over several years. The most common symptom is hearing loss in the ear on the side of the tumour, and this may be accompanied by a buzzing or ringing noise in the ear (tinnitus). Dizziness and loss of balance are also common due to involvement of the vestibular branch of the nerve.

Other symptoms may occur if the tumour puts pressure on, or causes damage to the trigeminal nerve (Vth cranial nerve) and the facial nerve (VIIth cranial nerve) that are near to the auditory nerve (VIIIth cranial nerve). If the trigeminal nerve is affected, this may lead to changes in sensation on the affected side of the face, including numbness, altered sensation, or pain, and may also affect chewing. If the facial nerve is affected, this may lead to facial weakness with drooping of the mouth and difficulty blinking.

Although much less common, very large acoustic neuromas can press on the brainstem, and this may affect walking and balance and can occasionally cause headaches. Sometimes the tumour does not cause any symptoms and may be found on a scan performed for another medical reason.



If a nerve has been permanently damaged before treatment starts, the treatment will not repair the damage. For example, deafness will not be reversed. However, damage may be due to pressure on a nerve and when this is relieved, there may be some improvement.

What tests and investigations will I need?

Acoustic neuromas are best seen on an MRI (magnetic resonance imaging) scan. Hearing tests and balance tests may be used to measure how much the nerve is affected.

Treatment options

Treatment options include observation, surgical removal and radiotherapy. Your doctor will discuss with you and advise the best treatment option(s) for you, taking into consideration your own preferences, your symptoms and the rate of growth of the tumour. It is important that you feel happy with any decisions that are made. Please discuss any concerns or questions with the nurse or doctor.

This factsheet outlines all options but will mainly focus on radiotherapy.

Observation

If the tumour is small and not causing problems, then immediate treatment may not be necessary. You may be advised to have a period of surveillance. This would involve 6 to 12 monthly scans and clinic reviews to assess the rate of growth of the tumour and to decide if treatment with surgery or radiotherapy is advisable. Your hearing may also be monitored.

What are the benefits of observation?

Observation has the advantage of withholding treatment until it is necessary, and therefore reduces exposure to the potential side effects of treatment. Some people may avoid treatment altogether.

What are the disadvantages of observation?

Some people may feel anxious about not being treated immediately and find the process of observation challenging. Any increase in tumour size is likely to be detected early, but there is a possibility of gradual hearing loss and larger tumours may cause symptoms as described above.

Surgery

All operations for acoustic neuromas require a general anaesthetic. Your neurosurgical team can discuss the practical details with you.

What are the benefits of surgery?

Surgery may allow complete removal of the tumour, so that no further treatment is required. Pressure on the nearby nerves should be immediately relieved by tumour removal after the tumour is removed.

What are the risks of surgery?

Surgery will result in the loss of hearing on the affected side and may cause temporary or permanent damage to the facial nerve and, rarely, the trigeminal nerve. This may lead to



symptoms described above, such as weakness of facial muscles (which may affect chewing) or loss of sensation on one side of the face. Further possible risks of surgery can be explained by your neurosurgeon.

Radiotherapy

Radiotherapy is delivered using high-energy x-ray beams (photons) which are focussed on the tumour. Radiation is commonly given in the form of stereotactic radiotherapy, either as stereotactic fractionated radiotherapy (25 once-daily treatment sessions), or as stereotactic radiosurgery (1–5 once-daily treatment sessions). These are discussed below. Radiotherapy may also be recommended after surgery if there is residual tumour which is growing.

What are the benefits of radiotherapy?

The aim of radiotherapy is to stop the tumour from growing. The success of radiotherapy treatment is described in terms of tumour control, which means that the tumour remains the same size or shrinks, and does not need further treatment. Following radiotherapy, tumour control is in the region of 90% at 10 years, meaning that 10 years after treatment, the tumour will not have grown significantly in 90 out of 100 people. Similar tumour control rates have been reported for fractionated radiotherapy and radiosurgery. Radiotherapy has the advantage of avoiding a general anaesthetic and the associated potential complications of surgery.

What are the risks of radiotherapy?

The risk of serious, long-term side effects is less than 3-5% (3 to 5 in 100 people treated). Unlike surgery where the damage is immediate, radiotherapy side effects may occur during or shortly after treatment (short-term side effects) or months to years later (long-term side effects). Short-term side effects are usually temporary and resolve completely. These include tiredness, small patches of hair loss, and neurological symptoms such as headaches, dizziness and tinnitus. Steroids are prescribed at the time of radiosurgery to reduce the likelihood of short-term neurological symptoms.

Radiosurgery may be more likely than fractionated radiotherapy to cause acute side effects due to the increased likelihood of temporary tumour swelling. This swelling may very occasionally cause the tumour to press on nearby nerves and the brainstem, which can block the flow of fluid from the brain. This is described as hydrocephalus and can result in headaches, nausea and vomiting. This complication is only seen in people with larger acoustic neuromas and is very uncommon. If it occurs, a simple operation to temporarily divert the flow of cerebrospinal fluid, may be required. A shunt (a small tube that drains the fluid elsewhere in the body) is usually used in these cases. Steroids are usually given to try to reduce this risk.

Long-term side effects may be due to damage to the small blood vessels, nerves and the part of brain surrounding the acoustic neuroma. They are uncommon but can be permanent. Damage to the facial and trigeminal nerves can cause symptoms described above in *What are the signs and symptoms of an acoustic neuroma?* on page 1.

The auditory nerve (VIIIth) is also at risk of damage leading to deafness, although sudden deafness is uncommon following radiotherapy. A decline in hearing may continue regardless of radiotherapy.



Damage to the brain next to the acoustic neuroma due to radiotherapy is very unlikely as the radiation doses used are relatively low. Although theoretically radiation may cause another tumour in the brain, so far there are no reports of radiation-induced brain tumours after treatment for acoustic neuroma.

Types of radiotherapy for acoustic neuromas

- Stereotactic radiosurgery
- Fractionated stereotactic radiotherapy.

All types of radiotherapy delivered at The Royal Marsden for acoustic neuromas will be delivered as stereotactic treatment. Stereotactic treatment describes a high precision radiation treatment, which focuses the radiation dose on the tumour. It requires a specially fitted face mask which keeps your head in the same position for each treatment. Each radiation beam is shaped to conform precisely to the shape of the tumour, enabling a very precise dose delivery to the target whilst minimising the dose to nearby areas. It is delivered as radiosurgery or fractionated radiotherapy.

Radiosurgery

Radiosurgery is usually appropriate for small acoustic neuromas. Treatment is delivered in a single session, but larger tumours may require up to five sessions. Higher doses of radiation are delivered at each treatment session in radiosurgery than in fractionated radiotherapy.

Fractionated radiotherapy

Fractionated stereotactic radiotherapy usually involves receiving up to 25 once-daily treatments over 5 weeks, each lasting 20–40 minutes.

How do I decide what to do?

The advice to have treatment is based on the balance of risks and benefits. Your doctor will be happy to discuss this with you in further detail.

Different treatment options may be offered to you and there may not be a clear answer as to which treatment is best for you. It is important that you ask everyone involved in your treatment all the questions that are important to you, so that you feel equipped to make the best decision for you. You may need to see an expert in each area to come to a decision.

Contact details

Neuro-Oncology Clinical Nurse Specialist (CNS)

Tel: 020 8915 6011

The Royal Marsden Macmillan Hotline: 020 8915 6899

(available 24 hours a day, 7 days a week)

Further information

www.nhs.uk/conditions/acoustic-neuroma/

