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## Acoustic neuroma

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### Summary

- An acoustic neuroma is a type of benign tumour that grows in the canal connecting the brain to the inner ear.
  - Without treatment, important nerves (including the hearing, facial and balance nerves) can be affected and the growing tumour may eventually encroach on the brain.
  - Treatment options include monitoring, surgery and radiation therapy.
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An acoustic neuroma is a benign, slow-growing tumour that originates in the canal connecting the brain to the inner ear. Other names for this type of tumour include 'vestibular schwannoma' and 'neurinoma'.

An acoustic neuroma begins in the cells that line one of the two nerves that make up the eighth cranial nerve. For unknown reasons, these cells (known as 'Schwann cells') multiply out of control and form a tumour. Eventually, larger tumours may involve other structures, including the brain stem.

Bilateral (on both sides) acoustic neuromas can occur in a hereditary disease called neurofibromatosis 2.

In its earlier stages, an acoustic neuroma can present similar symptoms to other, less serious conditions. This may delay diagnosis and treatment. More than 300 Australians are diagnosed with acoustic neuroma every year. Treatment may include surgery to remove the tumour and radiotherapy.

### The inner ear

The inner ear is an organ of hearing and balance. Sound waves vibrate the eardrum located in the middle ear. Three tiny bones (the incus, malleus and stapes) on the other side of the eardrum pick up the vibration and deliver it to a small organ called the cochlea, located in the inner ear. The vibration is translated into electrical impulses and passed onto the brain via the cochlear nerve.

The sense organ of balance is also located inside the inner ear. A series of fluid-filled canals, set at different angles, help the brain to pinpoint movement. As the head is moved, the fluid rolls around inside the canals and is monitored by tiny hairs. The information on the head's position is then relayed to the brain via the vestibular nerve, which lies alongside the cochlear nerve.

### Early symptoms of acoustic neuroma

No one knows what causes the Schwann cells of the eighth cranial nerve to multiply. Acoustic neuroma can be mistaken for a variety of harmless disorders.

The early symptoms of an acoustic neuroma may include:

- impaired hearing in the affected ear
- a ringing or buzzing sound in the ear, known as tinnitus
- difficulties with balance
- in some cases, facial numbness
- a sensation of fullness or blocking in the affected ear.

### Advanced symptoms of acoustic neuroma

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Symptoms of advanced acoustic neuroma can include:

- headache
- pain in the face
- facial numbness
- facial twitches
- visual disturbances, such as double vision
- difficulties swallowing
- eventual death as the functioning of the brain stem is impaired.

### **Untreated acoustic neuroma can be fatal**

An acoustic neuroma is usually benign, but it can still be fatal if left untreated. This is because the tumour will keep growing. Once it runs out of space inside the small canal that links the inner ear to the brain, it begins to grow into the skull cavity.

The tissue at the base of the brain, including a structure called the brain stem, may become squashed by the growing tumour. This can cause a build-up of fluid known as cerebral spinal fluid (CSF). The brain stem is responsible for regulating important bodily functions, including consciousness, heart rate, breathing, blood pressure and swallowing.

### **Diagnosis of acoustic neuroma**

The earlier the tumour is detected and treated, the greater the chance of a full recovery.

Acoustic neuroma can be diagnosed using a variety of tests, including:

- Computed tomography (CT) scan – this is a specialised x-ray that takes three-dimensional pictures of the inner ear. However, small tumours may be missed by this method.
- Magnetic resonance imaging (MRI) scan – pictures of the inner ear are taken, using radio waves in a strong magnetic field instead of x-rays. MRI scans can usually detect smaller acoustic neuromas than CT scans. A dye may be injected to further highlight the tissues under investigation.

### **Treatment for acoustic neuroma**

For small tumours, doctors may recommend no action at all, apart from regular checking. This is because an acoustic neuroma typically grows at a slow rate in the initial stages. However, often treatment is required.

Options may include:

- Surgery – microsurgery techniques are used to remove the tumour. However, side effects can include loss of hearing and facial nerve damage.
- Stereotactic procedure – is a non-invasive treatment that directs gamma radiation at the tumour. Side effects may also be experienced with this procedure.

### **Where to get help**

- Your doctor
- Ear, nose and throat specialist

### **Things to remember**

- An acoustic neuroma is a type of benign tumour that grows in the canal connecting the brain to the inner ear.
- Without treatment, important nerves (including the hearing, facial and balance nerves) can be affected and the growing tumour may eventually encroach on the brain.
- Treatment options include monitoring, surgery and radiation therapy.

**This page has been produced in consultation with and approved by:**

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