Gamma Knife: Vestibular Schwannoma patient information

The London Gamma Knife Centre
at The Wellington Hospital

part of HCA Healthcare UK

Treatment for vestibular schwannoma

Treatment for vestibular schwannoma (also known as Acoustic Neuroma)

These are usually slowly growing tumours arising from the nerves of balance (vestibular nerves) which cause pressure effects on the surrounding nerves of hearing, facial movement and sometimes facial sensation. Typically, they cause hearing loss on the affected side, balance disturbance and noise in the ear (tinnitus) but occasionally can also cause facial numbness and facial pain. They are not cancers and are not strictly brain tumours as they grow from nerve sheath cells (schwann cells) and push against the hind brain (cerebellum) and brain stem only when they are large.

Treating vestibular schwannom

1. **Observation with regular scans.** As these are usually slowly growing, they may take many years to cause symptoms from pressure effects and in some elderly individuals they may never require treatment. Generally, observation in younger individuals defers treatment rather than avoiding it and this may not be appropriate. Similarly, if a tumour is relatively large at the time of diagnosis, treatment at an early stage may be preferable. It is very rare for urgent treatment to be necessary, giving time for thought.

2. **Surgical removal.** Before radiotherapy treatments became more available and more accepted, surgery was recommended for most patients with vestibular schwannoma. There are a variety of surgical options relating to the anatomical pathway chosen by the surgeon, but generally any hearing on the affected side will be lost. Most surgeons try to remove the entire tumour when possible and this risks damage to the facial nerve, resulting in a possible complete facial paralysis on the side of the tumour. Other possible complications include leakage of cerebro-spinal fluid (CSF leak), infection, bleeding forming a blood clot at the site of surgery (haematoma), stroke due to damage to the surrounding arteries, damage to the hind brain and brain stem, facial numbness and swallowing

disturbance. Although most of these complications are rare, facial weakness is common and the risk increases in proportion to increasing tumour size. Some surgical approaches require additional wounds to harvest tissue grafts to pack the surgical area at the end of the operation with the extra discomfort that entails. The average length of hospital stay after these operations is around 5-7 days but may be much longer in the event of complications. Returning to work may be as rapid as 1 month after the operation, but often requires 3 months and may be more if there is a facial weakness. A significant number of patients do not return to work for a variety of reasons. Follow up after surgery often involves post-operative scans at intervals to ensure that there is no tumour recurrence – this is thought to occur in around 2-3% of patients depending on the type of surgery and the amount of tumour removed. If a small amount is left behind, this usually grows again over the years.

3. **Radiosurgery.**
Radiotherapy treatments have increased in popularity over the past 20 years. The term radiosurgery is generally considered to mean treatment after one session (fraction), but up to 5 fractions can be used in some centres and this is still regarded internationally as being radiosurgery. A single fraction is generally used to treat vestibular schwannomas. The dose of radiation given has reduced over the past 20 years, with a consequent reduction in side effects but without any noticeable reduction in the effectiveness. Although the term 'Gamma Knife' implies a surgical cutting of tissue, no knives are involved, and the technique employs converging beams of radiation, delivering a high dose of radiation to the tumour, with a much lower dose to the surrounding tissue. The success of treatment is measured by growth arrest rather than tumour removal with the efficacy being at least 95% as shown by the latest published results. There are different radiotherapy tools for delivering radiosurgery treatments, including Gamma Knife, CyberKnife and TrueBeam. It is considered that these treatments are probably equivalent, but Gamma Knife has the longest track record and most of the published results. There is also a demonstrably much lower dose of radiation to the body from the Gamma Knife compared with the CyberKnife and other linear accelerators, with a correspondingly lower risk of developing a cancer elsewhere in the body from that exposure.

Treatment day

Before the treatment

Before the treatment you doctor will inform you about the procedure and obtain your written consent. Gamma Knife radiosurgery does not require cutting or shaving your hair. The next step is the application of the head frame, if this is going to be used

Securing accuracy

The Gamma Knife treatment process involves fitting a metal frame to your head under local anaesthetic, a process that is uncomfortable, but which should not be very painful once the local anaesthetic has been injected. Sometimes as an alternative a radiotherapy mask can be used to keep your head still - speak to your doctor about this.

Target localisation

The frame is then tightened up to a predetermined setting. This initially seems very tight, but the feeling settles after a few minutes. Once the frame has been fitted, you will be rescanned (in the MRI scanner and sometimes in the CT) to give the necessary information to allow the Gamma Knife computer to map the tumour in your head with sub-millimeter accuracy.

Treatment planning

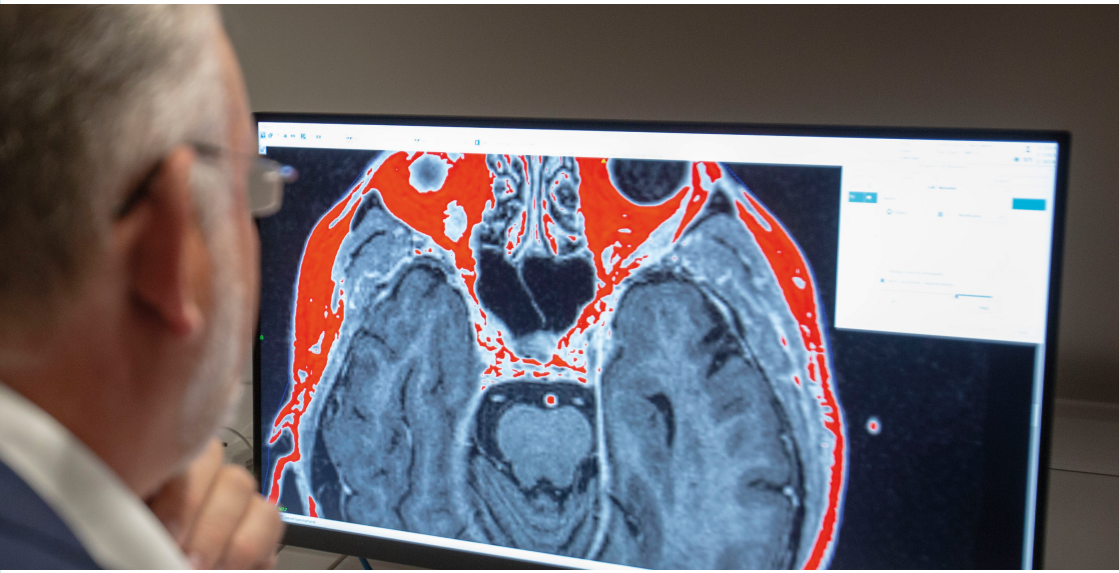
After the scan, you will be brought to the Gamma Knife Centre and kept comfortable. You will be able to eat and drink, but the frame means that normally a straw is needed for drinking. While you are waiting, the treating doctor and Gamma Knife physicist will be planning the radiation treatment. This may take some time as a number of checks are made to ensure accuracy of treatment before it is delivered.

The treatment

Once all of the checks have been completed, you will be placed in the Gamma Knife machine, lying flat on your back with your head supported. This position is comfortable for most, and many patients fall asleep during treatment. The treatment time depends on the size of the tumour, the complexity of the treatment plan and the dose of radiation prescribed. It will be possible to tell you exactly how long you will spend in the Gamma Knife once the plan has been finalized.

The aim and benefit of Treatment

The aim of treatment is to prevent the tumour from growing in the future. Radiosurgery often leads to some shrinkage over a number of years, but initially there may be some swelling which is due to the damage inflicted on the tumour by the radiation, and this is not a sign of treatment failure. Currently, at least 95% of these tumours are controlled by Gamma Knife radiosurgery.



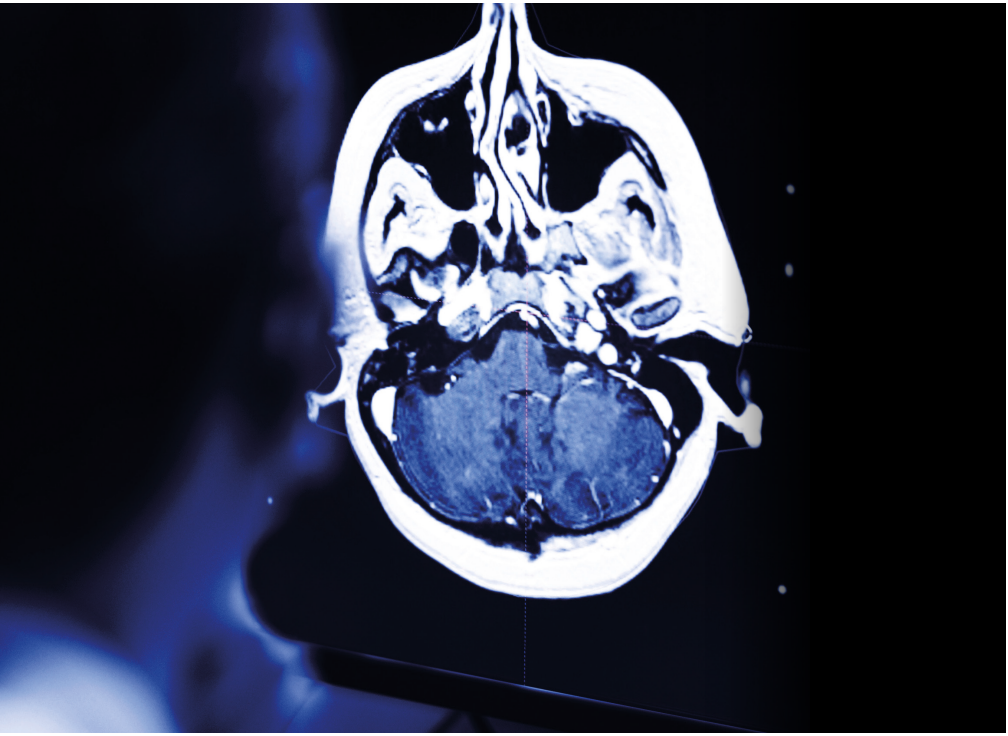
Possible risks

Common complaints

It is likely that you will experience mild headache when the frame is removed. Sometimes this is sharp pain, but it normally settles with simple pain-killers and rest for an hour or so after frame removal. There may be numbness over the back of the head as a result of bruising of the small nerves in the scalp from the pin pressure. This is commonly present for a few hours but may persist for a few months in rare cases.

Failure to control growth

If there is continued expansion of the tumour more than 4 years after treatment, we may recommend surgery to remove the mass. We generally do not retreat with Gamma Knife as this may lead to a higher risk of complications, although newer methods to determine if there are particular areas of growth within a tumour may allow an even more focused retreatment with radiation.



Hearing loss

If you still have reasonable hearing on the side with the tumour, there is a chance (around 50%) that we will be able to preserve at least some of it. The factors leading to loss of hearing are not well understood but include the radiation dose given to the organ of hearing (cochlea), tumour swelling (which may damage the nerve of hearing or reduce the blood supply to the cochlea) and possibly radiation exposure to the brainstem where the nerve of hearing enters (cochlear nucleus). We try to minimise the radiation dose to all of these structures but obviously the primary aim of the treatment is to stop the tumour from growing. Hearing loss may be sudden, or gradual and generally occurs within one year of treatment, but can occur later. If there is sudden hearing loss a trial of steroids may restore it. These need to be started on the day the hearing is lost.

Vertigo

A feeling of spinning, either you or your surroundings. This very unpleasant symptom is not common after treatment but can occur, particularly with small tumours. The reasons are not clear but may relate to the exposure of the organ of balance (the labyrinth) or to the balance nerves to radiation. With large tumours these nerves are no longer functioning, but they may still be working when the tumour is small. If this happens the symptoms usually improve with time, but this may require a few months.

Facial weakness

Although the risk is much less with Gamma Knife than with open operations there is a small chance (less than 1%) that facial weakness will develop after treatment. This usually develops within a relatively short time (perhaps a few months), but may occur within a few days and rarely can occur years later. Your face may be mildly or severely affected, and the severity tends to dictate the time needed for recovery, with those badly affected requiring much longer (many months). The recovery may not be complete leaving a degree of weakness for life – although this is unusual. Sometimes the radiation can cause facial twitching (risk again around 1%) which may start within a few months of treatment and usually recovers also within a few months

Facial numbness

The nerve of facial feeling (trigeminal nerve) is sometimes splayed over the top of these tumours. It is not unusual for patients to complain of a mild degree of altered feeling in the face before treatment and this may sometimes be worse afterwards. The risk of marked loss of sensation in the face, however, is less than 1%.

Where to find us

For further information please contact:

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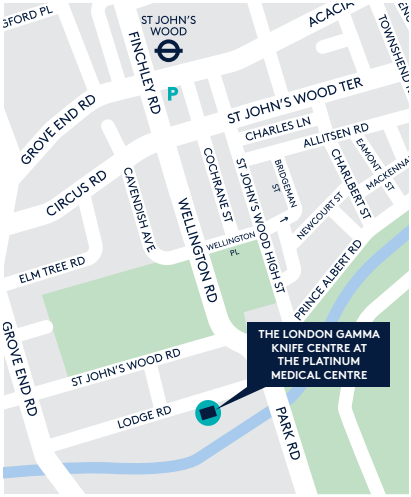

Underground

St John's Wood (Jubilee line) is a 15 mins walk

Baker Street (Bakerloo, Circle, Hammersmith, Jubilee & Metropolitan lines) is a 20 mins walk

National Rail

Marylebone is a 20 mins walk

Bus

Bus stop: Park Road / Lord's Cricket Ground. Bus no 13, 82, 113, 274, N13

Parking

Car parking is limited at the centre however parking is available nearby at the Q-Park St John's Wood car park on Kingsmill Terrace

020 3214 3500

www.hcahealthcare.co.uk

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