



## THE GAMMA KNIFE CENTRE AT QSRC Media Backgrounder

### What is Gamma Knife?

Gamma Knife surgery is a well established method of treating selected tumours or lesions in the brain. Gamma Knife is not a knife in the normal sense of the word. No incisions are made in the head. Instead, very precisely focused beams of radiation are directed to the treatment area in the brain, optimised to hit only the target without damaging surrounding healthy tissue. It offers a safe and effective treatment for some 80,000 patients worldwide every year with over one million treated in total. The treatment procedure is simple, painless and straightforward.

### What is the Gamma Knife used to treat?

The Gamma Knife is used to treat deep seated lesions, vascular malformations and metastases within the brain that are inoperable, or where normal surgery is expected to fail. These types of tumours include:

- Cancer metastases (tumours which spread from cancer in a different part of the body)
- Meningiomas (a tumour of the meninges, which are the protective membranes around the brain and spinal cord)
- Acoustic neuroma (vestibular schwannoma - benign tumour that develops from the lining of the auditory nerve)
- Other neuromas (a benign tumour)
- Pituitary adenomas (an abnormal growth, or tumour, in the pituitary gland)
- Trigeminal neuralgia (extremely severe facial pain that tends to come and go unpredictably)
- Vascular disorders (AVMs, cavernomas)
- Other small brain tumours

### How many patients in the UK could be treated by the Gamma Knife?

According to NHS England the number of patients receiving Stereotactic Radiosurgery is expected to more than double with 6,200 patients benefiting by 2018/9, compared to just over 2,400 in 2014/15.

Taking into account the prevalence of tumours in the UK – approximately 4,000 people in the UK with non-cancer related tumours and 21,000 with cancer related tumours and





access rates seen in other developed countries the total number of patients that maybe suitable for Gamma Knife treatment may be higher.

### How does it work?

There are 192 sources of cobalt-60 loaded within the treatment unit. Thousands of radiation beams can be generated from these sources with a level of accuracy better than 0.5mm, about the thickness of a strand of hair. Individually, each radiation beam is too weak to damage the normal tissues it crosses on the way to the target. But when focused precisely on that target, the beams intersect and the combined radiation is sufficient to treat the targeted area.

The radiation damages the DNA in the cells of the tumour or other abnormality being treated, such that the cells that make up the abnormal tissue targeted can no longer reproduce. Eventually, when these cells come to the end of their natural life span, they find that they are unable to reproduce and replace themselves because the DNA essential to this process is no longer functioning properly.

Because Gamma Knife radiosurgery is so accurate, the full dose of radiation can be delivered during a single session, compared with multiple visits for conventional radiotherapy treatments.

### What is the treatment process?

Treatment consists of the following steps:-

**Preparation:** A lightweight frame is fitted to the patients head which allows the doctor to accurately pinpoint the target to be treated. It also prevents the head from moving during imaging and treatment procedures.

**Imaging** - usually magnetic resonance imaging (MRI) scans or occasionally computed tomography (CT) scans. are used to determine the exact size, shape and position of the target in the brain.





**Treatment Planning:** A medical physicist and radiologist uses a specially designed computer system to calculate a precise and accurate treatment plan which the consultant reviews and prescribes treatment.

**Treatment:** Similar to having a scan, patients lie down with the head frame supported and remain awake and able to communicate with the Treatment team.

**After Treatment:** The majority of our patients return home the same day an hour or two after the treatment has finished. The effects of the treatment occurs over time. Radiation treatments are designed to stop the growth of tumours or dysfunctional tissue, which means that the effect will be seen over a period of weeks or months. Follow-up imaging such as MRI or CT may be undertaken 3-12 months after treatment.

### **Advantages of Gamma Knife radiosurgery**

Gamma Knife surgery has many advantages compared with traditional surgery and other types of radiation treatment. Neurosurgeons and patients often prefer Gamma Knife radiosurgery because:

- It's an outpatient procedure that takes less than a day
- It doesn't hurt
  - It doesn't require incisions, so there's no general anaesthesia and no risk of bleeding or infection
- It can treat even the most challenging, hard-to-reach brain tumours and abnormalities that traditional brain surgery can't
- Side effects, such as headaches and nausea, are rare and usually temporary
- Patients can return to normal activities the next day

Gamma Knife radiosurgery is performed in hundreds of leading hospitals around the world. With thousands of peer reviewed articles it has gained wide clinical acceptance. Results have proven to be superior or comparable to conventional neurosurgery or whole brain radiotherapy, depending on the specific condition treated.

### **The NHS SupraCentre for the South of England**



[www.queensquaregammaknife.co.uk](http://www.queensquaregammaknife.co.uk)





The University College London Hospitals Foundation Trust (UCLH) has successfully secured the contracts to provide services as the Supra Centre for the South of England, serving a population of some 31.3m, thus becoming the only centre in England designated to receive referrals for all commissioned indications whatever the age of the patient. The service will be delivered by a partnership between UCLH and QSRC Ltd that

derives a significant number of strengths from the well established integration between UCLH's diverse and many areas of expertise and the experience of QSRC Ltd in operating a Gamma Knife Centre. UCLH also has an arrangement with Great Ormond Street (GOSH) for paediatric patients.

### **Who are the key partners?**

The installation is a partnership between the National Hospital for Neurology and Neurosurgery (NHNN), part of UCLH NHS Foundation Trust and Medical Equipment Solutions Ltd. NHNN is the UK's largest dedicated neurological and neurosurgical hospital treating over 6,000 inpatients, 120,000 outpatients and 8,000 day cases each year. Medical Equipment Solutions Ltd is a premier provider of niche high technology equipment based healthcare services and is developing a network of radiotherapy and radisurgery centres across the UK (please see [www.m-e-s.co.uk](http://www.m-e-s.co.uk) for further information). For paediatric cases there is a partnership with Great Ormond Street Hospital.

### **Where can I find out further information about the Queen Square Gamma Knife Centre**

Further information can be found at <http://www.queensquaregammaknife.co.uk>. For images or to speak with Mr Neil Kitchen, Consultant Neurosurgeon and Medical Director of the centre please contact:-

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