THE LONDON GAMMA K NIFE CENTRE AT ST BARTHOLOMEW’S
In partnership with The Harley Street Clinic

CONSULTANT AND CCG GUIDE
The London Gamma Knife Centre at St. Bartholomew’s is a unique partnership between HCA International, one of the world’s largest private hospital groups, and Barts Health - NHS Trust, providing a high quality, cost-effective, radiosurgical service for patients.

With clinical input from specialists from Barts Health, the Centre was originally established in 1999 at Harley Street where over a thousand patients from all over the UK and overseas were treated. Acquired by HCA, and run by The Harley Street Clinic since, the Centre was accredited to receive NHS patients in 2002 and then moved to new, purpose-built premises at St Bartholomew’s Hospital, one of the UK’s leading cancer treatment and research centres in 2009.

The Centre’s clinical input is provided by specialists from Barts Health who hold regular multi-disciplinary team (MDT) meetings at which every case referred is discussed before treatment is approved. The MDT comprises neurosurgeons, clinical oncologists and neuro-radiologists.

All patients must meet strict clinical protocols and this ensures that only patients who are suitable for treatment are accepted. Although the clinical staff involved with The London Gamma Knife Centre at St Bartholomew’s are from the host Trust, the Centre is open to all interested consultants to present cases and treat, in collaboration with experienced Gamma Knife clinicians.

Contracts are in operation between NHS Clinical Commissioning Group (CCG) and the Centre offering a seamless referral pathway for patients.
Gamma Knife® treatment is minimally invasive and uses highly accurate delivery of radiation from 192 cobalt sources around the head to treat lesions within the skull. These converge at the point of treatment, ensuring highly accurate delivery of a therapeutic dose to the lesion while greatly reducing the dose delivered to the surrounding healthy brain tissue.

The London Gamma Knife Centre at St Bartholomew’s treats patients with the following intracranial lesions:

- Arteriovenous malformations (AVMs)
- Acoustic neuromas
- Meningiomas
- Trigeminal neuralgia
- Pituitary tumours
- Cerebral metastases
- Other rare tumours, considered on an individual basis

There are many advantages to Gamma Knife treatment when compared to standard microsurgery or other radiosurgical techniques. These include:

- Few post-treatment complications and rapid recovery. Most patients return to normal activity, even work, within one to three days. Sometimes patients require overnight admission to the neurosurgical unit after treatment, particularly for AVMs but most are treated as day-cases.
- Better treatment outcomes for AVMs and acoustic neuromas than with microsurgery and for other pathologies in selected cases outcomes are at least as good as, if not better than, conventional neurosurgery and radiotherapy.
- Treatment is performed on a single day in contrast to fractionated LINAC radiotherapy which may require between 5-30 treatment fractions.
- Treatment is precise. Thousands of radiation beams converge with a level of accuracy better than 0.5mm leaving nearby healthy tissue undamaged.
- There is a proven track record. Almost 500,000 patients have been treated worldwide and thousands of peer-reviewed scientific articles have been published.
- Treatment is safe. Unwanted radiation dose to the body is up to 100 times less than that of competing technologies. This is particularly important for the treatment of women of child-bearing age.
EVIDENCE FOR EFFICACY OF GAMMA KNIFE TREATMENT AND CLINICAL APPLICATIONS

There is now a wealth of available literature confirming the efficacy of Gamma Knife treatment for a variety of intracranial pathologies. The Society of British Neurological Surgeons, in conjunction with the regional Specialist Commissioning Group in their latest report on Stereotactic Radiosurgery/Radiotherapy considered the following conditions to be suitable for treatment but this list is not exhaustive.

CEREBRAL ARTERIO-VENOUS MALFORMATIONS

Stereotactic radiosurgery is firmly established as a useful component in a management strategy in which a multi-disciplinary approach to treatment is crucial. Treatments used to reduce the risk of re-bleeding can include microsurgery, interventional radiology and radiotherapy. Today most clinical experience is with Gamma Knife. Expected workload is around 300-500 cases per year. A complete obliteration rate of around 88 per cent at 5 years was reported by the Sheffield Gamma Knife Unit, leading to eradication of re-bleeds, with 3 per cent complications. Although often considered unsuitable for fractionation, more recent treatments at The London Gamma Knife Centre have irradiated large AVMs in 2 stages, with the doses separated by 6 months. This allows treatment of lesions previously considered too large for Gamma Knife.

ACOUSTIC TUMOURS

Until relatively recently microsurgery was considered to be the standard treatment although many small tumours can be kept under surveillance and may never need to be treated. In the USA more tumours are now treated by Gamma Knife than with surgery and this trend is likely to follow in the UK, partly due to patient pressure but also due to increased experience of the treatment among referring clinicians. Expected workload is up to 400 per year. Tumour ‘control rate’ with Gamma Knife has been reported to be around 90-95 per cent for lesions <3 cm with around 30 per cent becoming smaller. Unlike surgery, the risk of facial weakness, facial twitching, or facial numbness with current treatment doses (12.5/13Gy) is remote - less than 1 per cent.

When properly costed, Gamma Knife is cheaper than surgery, with most patients being treated as day cases and returning to work within a few days of treatment. There are almost no complications of treatment but the risk of malignant change is often quoted. Current data suggest that this risk is at most 1:1000 but may be as low as 1:10000 and is certainly less than the risk of a significant surgical complication. Only in patients with NF2 is the risk of malignant change higher than this.

MENTINGIOMA

Radiosurgery may be indicated when there is an intention to treat and surgical resection is either incomplete or not possible without inflicting significant deficits (cavernous sinus tumours in particular but also parasagittal remnants and cerebello-pontine angle tumours). Control is in the region of >90% or more for tumours with typical histology but is worse for WHO Grades 2 where the control is approximately 70% and even worse for WHO Grade 3 tumours which are considered by definition to be malignant, although even then radiosurgery may be worthwhile for palliation.

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PITUITARY TUMOURS

Conformal external beam radiotherapy is long established as a safe and effective method of treatment after incomplete tumour resection, tumour recurrence and also for endocrine active tumours that have not been cured by operation. Gamma Knife surgery achieves tumour control and has the advantage of being a day case treatment as well as achieving more rapid falls in hormone levels than after conventional radiotherapy. The risk of damage to optic nerves with Gamma Knife radiosurgery makes clear anatomical separation from the chiasm vital but even if the tumour is very close to the optic apparatus good dose planning may allow treatment to be given. The estimated workload is 400-600 patients per year.

TRIGEMINAL NEURALGIA

The potential workload is high (1,000 - 1,500 per annum). There is now significant literature regarding the efficacy of Gamma Knife radiosurgery from both Marseille and Pittsburgh. Although not as effective as microvascular decompression there is a cohort of patients unfit for or unwilling to consider surgery for whom nerve injury and facial numbness using percutaneous treatments can be avoided. Current figures suggest a three year efficacy of approximately 60% for Gamma Knife treatment with a 15% facial dysaesthesia risk but with very low anaesthesia rates. Retreatment using a complementary protocol is also possible with results approaching that for first time treatment.

CEREBRAL METASTASES

It has been estimated that approximately 15,000 patients per year could be considered for treatment. The decision to treat is usually determined by the major determinants of outcome which include the number of metastases present, control of the primary tumour, systemic remission and the Karnofsky score. For the treatment of small, single cerebral metastases, Gamma Knife is an alternative to surgical excision. It has the advantage of lower cost and is applicable to multiple lesions, deep lesions and patients unfit for surgery. Local “control” is achieved in 60-80% of patients. “Traditional” treatment involves primary whole brain radiotherapy but Gamma Knife has the advantage of a single treatment day instead of fractionation and can be repeated in the event of new lesions arising.

MALIGNANT PRIMARY BRAIN TUMOURS (GLIOMA/GLIOMBLASTOMA)

The estimated workload is 1,600-2,000 per year. These tumours infiltrate the brain beyond the edge visible on a CT/MR scan and therefore, are not suitable for primary Gamma Knife treatment. Conventional radiotherapy is normally used but Gamma Knife may be of benefit in some circumstances as a boost to conventional radiotherapy or as primary treatment for recurrence. As yet no convincing advantage for this use of the Gamma Knife has been shown and it should probably only be used for patients enrolled in clinical trials.

There is now a wealth of available literature confirming the efficacy of Gamma Knife treatment.
The London Gamma Knife Centre at St. Bartholomew’s has agreements with several Clinical Commissioning Groups to provide Gamma Knife treatment for their patients. Waiting time from confirmation of funding is only a few weeks and can be shorter if urgent cases such as patients with cerebral metastases are being treated.

For more information, contact

The London Gamma Knife Centre at St. Bartholomew’s on:

020 3465 6006/7007

USEFUL LINKS

- The London Gamma Knife Centre at St. Bartholomew’s
  www.thelondongammaknifecentre.com
- The Harley Street Clinic
  www.theharleystreetclinic.co.uk
- Barts and The London Centre for Neurosciences
  www.bartsandthelondon.nhs.uk/neurosciences
- Society of British Neurological Surgeons, Report on Stereotactic Radiosurgery
  www.sbrs.org.uk/site/1095/default.aspx
- NICE guidelines for Trigeminal Neuralgia
  www.guidance.nice.org.uk/IPC385
- International Stereotactic Radiosurgical Society
  www.isrsy.org
- Elekta
  www.elekta.com
- British Acoustic Neuroma Association (BANA)
  www.bana-uk.com
- Trigeminal Neuralgia Association
  www.tna.org.uk
- Angioma Alliance
  www.angiomaalliance.org

There is a secure on-line referral system that can be used by consultants. To access this service please visit www.thelondongammaknifecentre.com and click on “referrals” which is on the top navigation bar.

Referrals may also be made by writing, phoning or faxing one of the consultants at the Centre.

Referrals are normally submitted by specialists (neurosurgeons, oncologists, ENT surgeons etc) but referrals from GPs will also be considered by the MDT. Self-referral by patients is discouraged as the Centre prefers to involve referring clinicians in follow-up and subsequent care, including scans and angiograms as needed. This information is essential for the unit to undertake clinical audit of outcomes.

For details about the consultants who treat at The London Gamma Knife Centre at St. Bartholomew’s, please go to:

www.thelondongammaknifecentre.com
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