

LEKSELL GAMMA KNIFE  
PERFEXION



# A GENERAL GUIDE TO GAMMA KNIFE SURGERY

# General guide to gamma knife surgery

Welcome to the Bupa Cromwell Hospital Gamma Knife Centre. This leaflet explains what will happen when you come to the hospital for gamma knife surgery. It aims to answer the main questions you're likely to have, but please feel free to raise any other questions with your doctor or another member of the gamma knife team.

## What is gamma knife surgery?

Gamma knife radiosurgery uses a beam of radiation to treat conditions affecting the brain, head and neck. It does not use a knife but is a non-invasive treatment that does not need any skin incision.

## The benefits of gamma knife surgery

The accuracy of the gamma knife radiosurgery system enables a high dose of radiation to be focused on a very precise area. This means one treatment is generally all that is needed. One of the major benefits of gamma knife radiosurgery is that it is non-invasive. Other benefits include the following.

- There is no incision. This means you won't need to shave your head and you'll have no scars to heal. It also avoids the risks that can be associated with open surgery, such as bleeding and infection.
- You're unlikely to have hair loss or nausea.
- The procedure is relatively painless and in most cases a general anaesthetic isn't needed.
- We find that most people get back to their normal activities in a day or two (compared to two to six weeks recovery time with conventional brain surgery).

Gamma knife radiosurgery usually has minimum complications. Indirect comparisons suggest it produces fewer complications than other treatment techniques.

## A safe and caring environment

The gamma knife team is under the direction of two of the most experienced gamma knife surgeons in the world. This team includes highly qualified and experienced neurosurgeons, clinical oncologists, neuroradiologists, medical physicists and other health professionals, including radiographers.

## Arriving for treatment

You will be asked to arrive either the night before or on the morning of your treatment. You should go to the main hospital reception where you will be greeted and, once the admission process is completed, taken to your room.

You will be able to rest and relax in your room whenever you are not having scans or treatment. Specially trained nurses are on hand should you need them. The consultant who is responsible for your care may also come to see you.

### *What to bring*

Although you will probably only stay at the hospital for one night, it is best to bring toiletries for two to three days in case your stay is longer than expected. You may like to bring your own dressing gown. If you like, you can bring a CD with your choice of music to be played for you during treatment.

### *Friends and relatives*

Friends and relatives are very welcome to visit you in your room at any time up until 10pm. They can stay in your room during the day and wait for you to return in between your preparation and treatment stages.

We have a selection of hot and cold refreshments, fresh sandwiches and sweet and savoury snacks available in our coffee shop on the ground floor. This is open 8.00am - 6.30pm (Monday to Friday) and 9.00am - 1.00pm (Saturday). The hospital restaurant is located on the lower ground floor and is open to visitors for breakfast from 7.15am to 10.00am (Monday to Saturday), 8.15am to 10.00am (Sunday and public holidays), and for lunch from 12.00pm to 2.00pm.

We ask that only one relative accompanies you into the gamma knife treatment suite, due to space restriction.

### **Preparing for your gamma knife surgery**

On the morning of your treatment you should not have anything to eat or drink for four hours before your head frame is fitted, unless you are diabetic. You will also be asked to:

- wash your hair (or you can do it the night before if you have an early morning appointment). You can use shampoo and conditioner but you shouldn't use any hair styling products such as gel or hairspray
- take off any eye make-up
- remove any metal items such as jewellery or clothes with metal hooks or clips
- put on a hospital gown

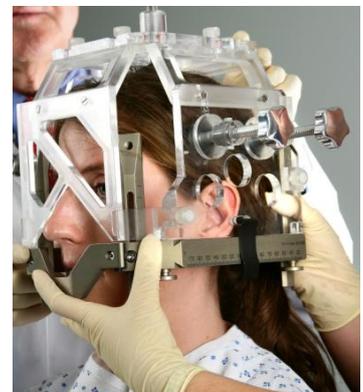
You may be offered medication to help you relax before the procedure. The doctor or nurse will talk to you about this.

Once you are ready, you will go down to the Gamma Knife Centre. You will meet one of our radiographers who will stay with you throughout the day. He or she will be able to explain the whole procedure and answer any questions you may have.

### *Fitting your head frame*

Before treatment can begin, you will need to have a head frame fitted. Your head will be cleaned with alcohol but you won't need to have any of your hair cut or shaved.

The doctor will inject local anaesthetic into four places on your head. The frame will then be attached to your skull with four screws (see picture alongside). You may feel some pain when the anaesthetic is injected. You may also have a sense of increased pressure on your head as the frame goes on, but this will gradually disappear.



It takes approximately 15 minutes for the frame to be fitted. You will then keep it on until your treatment has finished.

## Planning your treatment: stage one - imaging

Before you have gamma knife surgery we need to map precisely the target area that will be treated. This is done using one of the following imaging techniques - magnetic resonance imaging (MRI), computed tomography (CT scan) or brain angiography (AG). Your doctor will decide the most appropriate one for you.

### *MRI scan*

An MRI scan uses magnets and radio waves to produce images of the inside of your body. Before your MRI scan, you will be asked to lie on the couch and you will be given an injection of a special dye called contrast medium. This is used to make certain organs or blood vessels show up more clearly in the scan. You should tell the radiographer if you know that you're allergic to contrast medium or if you have any other allergies.

A box will be attached to your head frame and the frame will be attached to the couch. This is to make sure that your head doesn't move at all, otherwise the quality of the pictures could be affected.

The couch will then be moved into the scanner which is like a large tunnel, open at both ends. Some people feel claustrophobic while they are in the scanner so let the radiographer know if you're worried about this. The scan takes approximately 45 minutes.



You won't feel anything but you will hear a regular drumming noise as the magnetic fields are switched on and off. This is normal and nothing to be concerned about. The radiographer won't be in the scanning room with you but he or she will be able to see you and speak to you through an intercom. You will be given an alarm call button to use if you need to attract the radiographer's attention. A friend or family member may be with you in the scan room if you wish (he or she will be asked to fill out the same safety questionnaire as you before entering the scan room).

### *CT scan*

Occasionally a CT scan may be carried out as well as, or in place of, an MRI scan. A CT scan uses X-ray equipment and computer software to create images of the inside of your body. You lie on a couch which slides in and out of the ring shaped scanner.

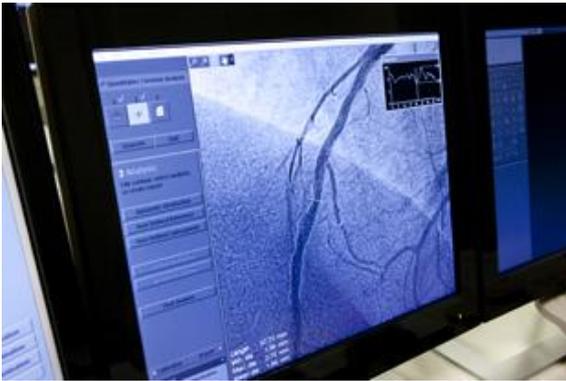


The procedure is similar to the MRI scan and your head frame will be attached to the CT scanner couch so that it cannot move. You may also need to have an injection of contrast medium. When this is injected you may have a warm sensation in your head. This is quite normal and nothing to be worried about. A CT scan takes approximately 15 minutes.

### *Brain angiography (vessel imaging)*

This procedure is only necessary in a few cases, and is mainly for patients with arteriovenous malformations (AVM). Your doctor will have talked to you about brain angiography if you need to have it.

A brain angiogram involves putting a long, thin, flexible tube (catheter) through your arteries. Contrast medium is injected through the catheter so that the blood vessels are clearly visible on X-ray images.



You shouldn't have anything to eat for four hours before your angiogram, but you can drink clear liquids.

The catheter will be inserted through your groin. This area will be numbed with a local anaesthetic and we may need to remove some hair using a clipper. The doctor will make a small cut in your skin (usually a few millimetres) where the catheter can be inserted into an artery. The catheter is then guided through the arteries to the area to be examined.

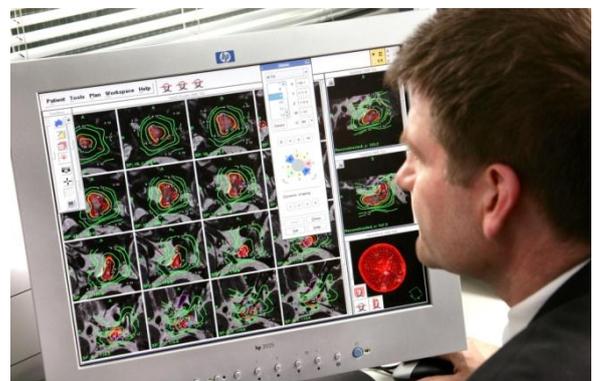
The contrast medium is injected through the catheter. When this happens you may feel a warm or slight burning sensation but this will pass quickly. When the dye reaches the blood vessels being studied, several sets of X-rays are taken. The catheter is then removed and the cut is closed. This is usually done by putting pressure on the area for about 10 minutes.

You will need to lie in bed with your leg straight for about four hours to allow the blood vessel to seal properly. You'll be able to eat and drink but we advise you just to have a light meal and a glass of water. You can sit up slightly (about 30°) to eat. After six hours you'll be able to walk gently. You'll be able to return to all your normal activities the following day.

### **Planning your treatment: stage two**

Once all the necessary examinations have been carried out, and depending on how long the planning process will take, you will either go back to your room (wearing the head frame) or stay in the gamma knife department.

A neuroradiologist and a physicist will work with your consultant in planning your gamma knife treatment. The computerised images from the CT, MRI or angiography scans are fed into a computer which maps out the target area to be treated. It calculates the exact dose, treatment time and head position. The planning can take from as little as 30 minutes or as much as several hours.



While you are waiting, you will be given something to drink and something light to eat if you are not feeling sick. This is also the time when you can take any regular medication if needed. Although you will have the frame on, you can still watch television, read or chat with relatives.

## Your gamma knife treatment - radiosurgical procedure

When the planning process has been completed, you will be taken into the gamma knife treatment room. You will be asked to lie on a moving couch which is attached to the gamma knife machine. Your head frame will be attached to the docking device on the treatment couch to keep it completely still. Once your head has been positioned and the gamma knife radiographers have made their checks, everyone will leave the treatment room. Cameras in the room mean that the radiographers will be able to see you at all times. There is also a small microphone so you can talk to them at any time.

The door of the gamma knife machine will open and the bed will move inside it. The treatment is made up of a series of exposures (shots), with the gamma rays focusing on a slightly different target area each time. When the treatment in one area is finished, you will be automatically repositioned for the next exposure. Each exposure lasts several minutes, but the whole procedure can take several hours. You won't feel any pain during it.



When your treatment is finished, you'll be taken through to the preparation room and your head frame will be taken off. You may bleed slightly from the places where the screws were attached. You'll probably find that these areas will be sensitive for several days.

## After your treatment

Once the frame has been removed, you'll be taken back to your room to rest. Tell the nurses if you have a headache or nausea, and they will give you medicine to relieve the symptoms. If you feel fine you can take short walks around the ward.

Either in the early evening or the next morning, depending on when your treatment started, your doctor will come to see you and discharge you. Occasionally patients are asked to stay one extra night when the treated area is close to a part of the brain that might produce temporary side effects.

Your doctor will talk to you about your follow-up appointment. This normally includes an MRI scan (and/or angiography for patients with arteriovenous malformations). We will give you an advice leaflet to take away. A full medical report will be sent to the doctor who referred you.

## Questions and answers

In the following section we have answered a few of the most frequently asked questions and hope this will help to answer some of yours.

**Q. Will the procedure hurt?**

A. When the head frame is being fitted, you will have injections of local anaesthetic and you'll feel some pain from these. The actual gamma knife treatment is a totally painless procedure.

**Q. How long does the treatment last?**

A. Scanning and gamma knife treatment will take up most of a day. The time you spend actually in the gamma knife machine will depend on the size of the target area and how many 'shots' of gamma rays are needed to treat it properly. Each shot lasts from two to

30 minutes; the total treatment time therefore ranges from around half an hour to several hours.

**Q. Is it safe?**

A. Gamma knife surgery is very safe in terms of the risk of damage to tissue around the target area. However, if the target area is large or the abnormal tissue requires intense irradiation, there is a risk of temporary swelling of surrounding areas and a small percentage of patients may experience abnormal feelings, sensations or fits. These symptoms are very rare, temporary and treatable with drugs.

**Q. Will I be radioactive?**

A. No. The gamma ray particles pass through the target cells, either colliding with molecules in the tissues or passing out of the body to give up their energy harmlessly in the treatment room.

**Q. Will I see or feel anything?**

A. The only sensation you will have is where the frame presses on your scalp. You may be aware of a flashing red light in the room, which indicates that treatment is taking place.

**Q. How will I feel afterwards?**

A. You will probably feel tired with some discomfort around the points where the head frame was held in place. You may have tension headaches for a day or two. You may also have some nausea during the first 48 hours after treatment.

**Q. Will I lose my hair?**

A. You will most likely not lose any hair. It happens occasionally if the area being treated is close to the skin surface.

**Q. When will I know if the treatment has worked?**

A. Generally changes in the target cells take place over many months. You will need regular follow ups, with an MRI scan, to monitor any change. Your doctor will talk to you about this.

**Q. After treatment is there anything I should or shouldn't do?**

- A.
- Do not scratch the scabs over the pin sites as they act as a barrier to infection and should fall off of their own accord in a few days. You shouldn't wash your hair for a few days for this reason.
  - Do not use any creams or lotions on the pin sites.
  - Do take mild painkillers if your head is still sore after leaving hospital.
  - If you notice pain, swelling or an increase in redness at the pin sites please go directly to your GP who may give you antibiotics for an infection.

**Q. When can I resume my normal routine?**

A. You may return to your usual routine as soon as you feel fit enough. This may be the day after treatment or it may take a few days.

**Q. When can I go back to work?**

A. You can go back to work as soon as you feel well enough. The treatment is non-invasive and there is no reason why you shouldn't go back to work the next day, although most patients prefer to have a few days of rest.

**Q. When will it be safe to fly?**

A. In most cases you will be able to fly straight after treatment. However, if you have any swelling in the treated area the doctor may suggest that you don't fly for two or three days.

**Q. What side effects may I experience immediately and in the longer-term?**

A. Immediately after the gamma knife surgery, you may experience tiredness, a headache and some tenderness at the pin sites. These normally only last for a few days. Your doctor will talk to you about any possible longer-term side effects.

**Q. How will my GP/referring doctor know that I have had my treatment and how it went?**

A. Your consultant will write to your GP/referring doctor giving details of your treatment and how it went, along with recommendations for your after care.

**Q. What follow-ups will I need?**

A. You will need to have further MRI scans (and/or angiography if you have arteriovenous malformations). Your consultant will advise you when these need to be carried out.

**Q. When will I know the final results of my treatment?**

A. In most cases a successful outcome will be known within two years although in some cases, for example if you have trigeminal neuralgia, the final results may be earlier. Some medical conditions require precautionary monitoring over many years.

**Q. Who should I contact if I have any problems after the treatment?**

- A.
- your treating consultant
  - your GP or other referring consultant
  - the Gamma Knife Centre

## Contact

If you have any questions about your treatment, contact the Gamma Knife Centre on +44 (0)20 7460 5938/5 or fax +44 (0)20 7460 5940. The centre is open from 9.00am to 5.30pm, Monday to Friday.

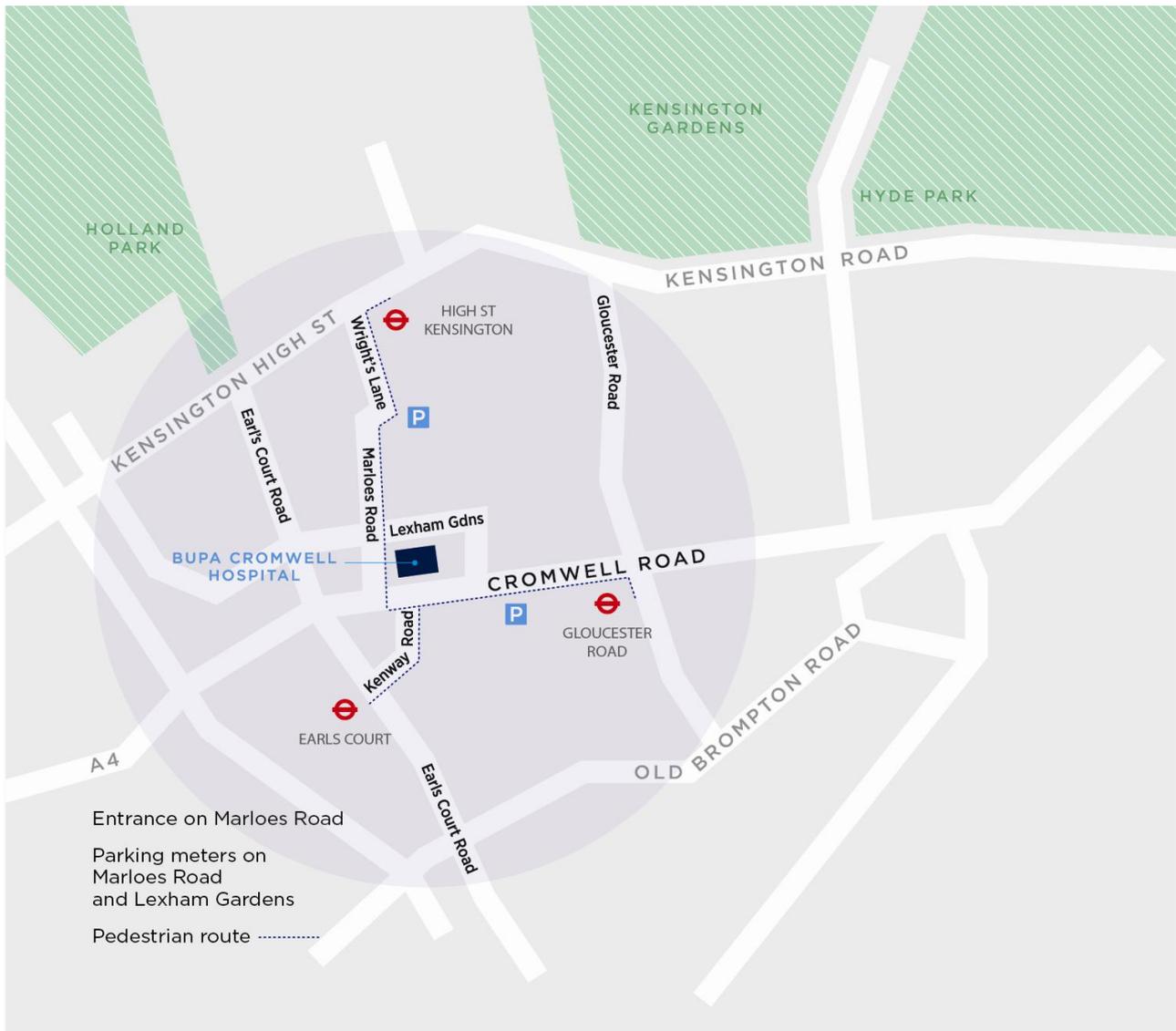
## Statement of purpose

The Bupa Cromwell Hospital Gamma Knife Centre aims to provide the best possible care for all patients undergoing stereotactic radiosurgery. We aim to offer a service that is caring, professional and safe for patients as well as staff. The service is based on standards set by the relevant professional organisations (for example the Royal College of Surgeons, Royal College of Radiologists and the Society of Radiographers). If you have any questions or concerns on the services of the Gamma Knife Centre please contact:

Renay Joss, manager	+44 (0)20 7460 5949
Jamuna Hashim, co-ordinator	+44 (0)20 7460 5935
Alba Martinez/Rosemary Coles, secretary	+44 (0)20 7460 5938

Alternatively, you may contact the Complaints and Claims department at Bupa Cromwell Hospital on +44 (0)20 7460 5735 or The National Care Standards Commission on +44 (0)20 8735 6373.

## How to find us



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