NHS
University Hospitals Birmingham
NHS Foundation Trust

Stereotactic Radiosurgery and Fractionated External Beam Radiotherapy for Pituitary Adenomas

Building healthier lives

UHB is a no smoking Trust

To see all of our current patient information leaflets please visit
www.uhb.nhs.uk/patient-information-leaflets.htm

This leaflet has been given to you to provide some written information about the treatment that is being planned for you in addition to the explanations that you have received from your doctor. If you have any questions please get in touch with the specialist radiographers (contact details can be found at the end of this leaflet).

Throughout your care there may be different health professionals who can guide and support you during and after treatment. To help you manage your care you will be allocated a key worker during your treatment. Your key worker is a named person who can act as a point of contact. The key worker will be a member of the team who is currently involved in your care and so may change during the course of your care as appropriate. The key worker will not provide all the care and support you need, but will be able to put you in touch with the right people to help you or will help you to get the information you need.

The key worker will always be a trained health professional who may also have another role to play in your care. For example, it may be a Clinical Nurse Specialist, radiographer, Macmillan nurse, doctor, community nurse, psychologist, physiotherapist, or social worker.

What is a pituitary adenoma?

Most pituitary tumours are pituitary adenomas: benign (non–cancerous), slow–growing tumours that arise from cells in the pituitary gland. The pituitary gland is located at the base of the brain; just behind the bridge of the nose.

The pituitary gland is made up of different types of cells, each producing specific hormones which are released into the bloodstream and control the endocrine glands and other organs in the body.

Pituitary adenomas originate from usually one (or more) of these specialised cell types. If the tumour cells secrete an excess of one or more hormones it is called a “functioning” adenoma,

whereas tumours that do not secrete hormones are called "non–functioning adenomas." Pituitary adenomas may also cause pressure effects on surrounding structures (most commonly the normal pituitary gland or the nerves of vision leading to loss of the normal hormone production or damage to the eyesight).

What are the treatment options for pituitary adenoma?

Where treatment is indicated, surgery is generally the first choice because it has the potential to cure or decrease the consequences of the tumour. For some functioning adenomas, drug therapy may be the first option. For non–functioning adenomas, control by drugs is not available; however, surgical removal and observation may be an acceptable alternative.

Radiotherapy is typically reserved for those tumours which can not be surgically removed to an acceptable extent or controlled through drug therapy. It may be also considered if the tumour grows following previous treatment. This can either be using stereotactic radiosurgery (using the CyberKnife) or fractionated external beam radiotherapy. Both of these are explained below. Your team of doctors (surgeons, endocrinologists and oncologists) will decide which treatment or combination of treatments is right for you based on the size and shape of your pituitary adenoma. Your doctor will discuss the options with you in clinic. Occasionally, we may recommend starting the radiotherapy planning process and then, based on findings, decide which option is best. If this is the case, we will ask you to come back to clinic so we can discuss this further prior to your treatment starting.

What is radiotherapy?

Radiotherapy is a treatment which involves precisely targeting high energy X-rays (ionising radiation) at a specific area with the aim of destroying any abnormal cells there. In the same way that having a normal X-ray does not hurt, you will not see or feel anything whilst you are having radiotherapy.

What is stereotactic radiosurgery?

Stereotactic radiosurgery is a highly focussed treatment which involves precisely targeting many radiotherapy beams at the pituitary adenoma which is visible on your brain scan. The aim is to destroy the cells within the targeted region. If only one treatment is given, it is often called stereotactic radiosurgery (SRS).

At the Queen Elizabeth Hospital, we give stereotactic radiosurgery using a CyberKnife. This is a specialised radiotherapy machine mounted on a robot arm so that the radiotherapy can be given very accurately to small areas within the brain.

It is extremely important that you are not pregnant or become pregnant during your course of radiotherapy. Even a small amount of radiation may damage an unborn foetus so it is very important to let the radiographers know at once if you think there is even a possibility that you may be pregnant before any radiation exposures are given on the CT scanner or CyberKnife unit.

Having radiotherapy does not make you radioactive. There is no need to restrict your contact with other people, including children and pregnant women.

Why do I need to have radiotherapy or stereotactic radiosurgery?

Radiotherapy or stereotactic radiosurgery (using CyberKnife) for pituitary adenoma has been recommended for you as a treatment option by your team of doctors to try and stop the adenoma growing and/or to stop it from producing hormones.

What are the benefits of stereotactic radiosurgery?

The accuracy of CyberKnife means that a high dose of radiotherapy can be focussed on a very precise area. This means that generally, only one treatment is needed. The treatment is given to try and permanently stop the growth of the pituitary adenoma and control its hormonal secretion (if it is functioning).

What are the benefits of fractionated external beam radiotherapy?

If the pituitary tumour is large or very close to important structures (for example the nerves of vision), the radiation dose may need to be divided over 25–28 daily treatments. This is to try and reduce the chance you will experience any long-term side effects related to damage of normal parts of the brain and the pituitary that may have also received irradiation.

When is stereotactic radiosurgery given?

Stereotactic radiosurgery is given in a single treatment on a weekday. The treatment is delivered in the CyberKnife unit (radiotherapy room 9) in the Radiotherapy Department in the Heritage Building, Queen Elizabeth Hospital.

CyberKnife

When is fractionated external beam radiotherapy given?

Radiotherapy is given in either 25 or 28 treatments on consecutive weekdays (Monday – Friday for 5 or 5 and a half weeks). The treatment is delivered in the Radiotherapy Department in the original Queen Elizabeth Hospital.

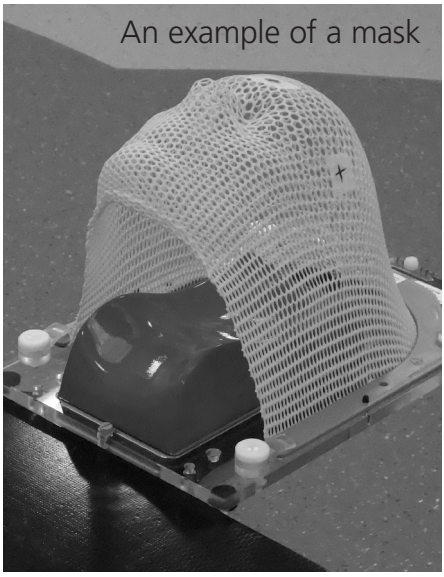
What needs to happen before I start radiotherapy (both stereotactic radiosurgery and fractionated external beam radiotherapy)?

Radiotherapy requires careful planning and preparation. You will need to have some further scans done in order to plan your treatment appropriately. This will include having a mask made, a planning CT scan which is done within the Radiotherapy Department and a MRI scan done in the main hospital.

What needs to happen for my radiotherapy (both stereotactic radiosurgery and fractionated external beam radiotherapy) to be planned?

For your treatment we will need you to lie on a couch and wear a mask. Your first visit to the Radiotherapy Department is to the Mould Room where the mask is made. This mask is made in the 2–4 weeks prior weeks prior to starting radiotherapy. It fits over your head and is attached to the treatment couch. The mask is needed to keep you in exactly the same position so that treatment can be given very precisely to the correct area.

Making the mask involves warming a sheet of plastic so that it softens and becomes flexible. It can then be gently draped over your head and moulded to you. The mask then needs to stay in position for about ten minutes whilst it hardens and sets. The plastic is warm and feels like having a warm flannel over your face. The mask needs to be a close fit, but has small holes in it so that you can still breathe easily.



An example of a mask

After the mask is made, you will have a CT scan which is done with the mask on. The CT scan will be done and then repeated with contrast (dye) which will involve an injection into a vein in

your hand or arm. The contrast is used as it makes it easier for the doctor to plan your treatment.

After your CT scan, the radiographers will give you the details of your first radiotherapy treatment appointment and show you where your treatment room is. They will try to accommodate you if you have a preference for morning or afternoon appointments, and can arrange hospital transport for your treatment if necessary.

You will also meet a CyberKnife radiographer if you are having treatment on CyberKnife who will provide you with a prescription for some steroids and ant-acids which needs to be started the day before your treatment.

After your CT scan the team will plan your treatment.

What happens when I come to the CyberKnife unit for stereotactic radiosurgery?

Your treatment will be on a weekday. This appointment normally takes around 1 hour. The radiographers will explain what is going to happen and show you the CyberKnife unit. The machine moves around the room and can make some noises. When all your questions have been answered, the radiographers will ask you to lie on the treatment couch, put your mask on and then move you into the correct position.

The radiographers will then take some X-ray images to confirm your position before they start the treatment. They may come in and out of the room and adjust your position slightly. The treatment machine will then move around you, and will only be on for brief periods before moving to the next position. You do not feel anything whilst the treatment is being delivered but you may hear and see the machine moving. You must stay as still as possible.

Whilst you are on the treatment couch, the radiographers will continue to take and assess X-ray images during your treatment to ensure your position remains perfect. Assessing these images

may take some time and need discussion with other members of the team. These images involve a very small additional dose of X-rays, but are essential to ensure accurate treatment.

The radiographers cannot stay in the room with you whilst the machine is on but they are operating the machine and watching you all the time on cameras. If for any reason you need the radiographers, then just raise a hand and they will immediately stop the treatment and come in. You are welcome to bring a CD with you so you have something to listen to whilst you have your treatment.

CCTV use

The treatment rooms are monitored during your preparation, positioning and treatment delivery by television cameras. This is part of ensuring the accuracy of your treatment and your safety and well being in the rooms at all times. We assure you that the camera image feed is live and it is not possible to make a recording. The images are viewable on screens situated in the machine control areas. The control areas are only accessed by authorised radiotherapy staff, some of whom may not be directly involved in your care at the time. If you have any concerns about your privacy or dignity, that you have not already discussed then please do not hesitate to highlight your concerns during the information discussion with the radiographers at your first appointment.

What happens when I come to the Radiotherapy Department for fractionated external beam radiotherapy?

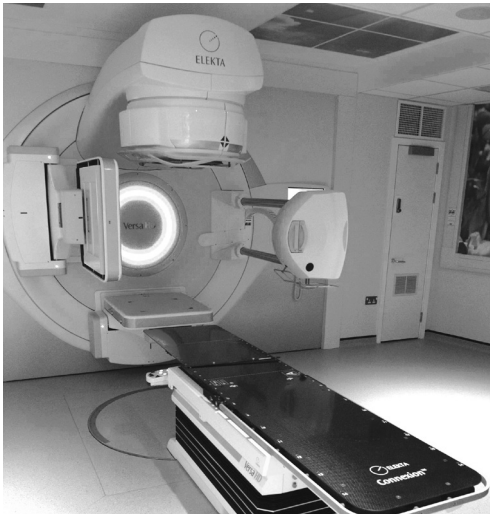
Your treatment will be on a weekday. This appointment normally takes around 15–20 minutes. The radiographers will explain what is going to happen and show you the treatment machine. When all your questions have been answered, the radiographers will ask you to lie on the treatment couch, put your mask on and

then move you into the correct position.

The radiographers will then take some X-ray images to confirm your position before they start the treatment. They may come in and out of the room and adjust your position slightly. The treatment machine will then move around you and deliver beams of radiation from some different angles. You do not feel anything whilst the treatment is being delivered but you may hear and see the machine moving. You must stay as still as possible.

The radiographers cannot stay in the room with you whilst the machine is on but they are operating the machine and watching you all the time on cameras. If for any reason you need the radiographers, then just raise a hand and they will immediately stop the treatment and come in.

You will then be given details of your further appointments. You will receive the same treatment every day but subsequent treatments may be quicker as the radiographers have fewer checks to do and you have fewer questions to ask as you know what to expect.



Linear accelerator

What happens after my treatment?

You can go home after your treatment. You may be taking steroid tablets if advised by your doctor.

What side effects may occur after my stereotactic radiosurgery treatment?

Stereotactic radiosurgery has relatively few side effects, and these differ between patients.

Commonly, patients experience tiredness. Some patients can get headaches which usually settle with simple painkillers like paracetamol. Occasionally patients need courses of steroids as the treatment can cause swelling in the brain. There is also a small risk of an epileptic fit after the treatment.

Long-term complications are unusual. Damage can occur to an area of normal brain and this is called radiation necrosis. Necrosis means that some of the cells have died. Most people who develop this do not have any symptoms. It can cause swelling which may be treated with steroids. Very occasionally an operation may be required. Any swelling or damage to the brain carries the potential for an associated disability which depends upon the region of the brain involved.

Radiosurgery can damage the function of the normal pituitary gland. Your doctor will discuss this with you. Hormone deficiencies can occur many years after treatment, and if this happens, you may require hormone replacement treatment by your hormone doctor (endocrinologist).

If the tumour is close to the nerves of vision, there is a small risk that there could be a disturbance in eye sight or double vision following treatment.

There is a very small chance that radiosurgery could cause a narrowing of blood vessels in the future. There have been reports of an increased risk of stroke many years later. The risk of this is extremely low and has not been proven.

Any radiation treatment carries a very low risk of a second tumour in the brain developing in the future.

Your consultant will discuss the possible side effects in more detail when you consent to treatment. If you have any concerns with side effects, either above or those raised through discussion, please do contact your consultant or key worker.

What side effects may occur after my fractionated external beam radiotherapy?

You may become tired as your treatment progresses. This can last for several weeks after treatment has ended. Hair within the area will gradually fall out. This tends to start about two weeks into treatment. In most cases, this is minor and hair will regrow a few months after completion of radiotherapy. Skin in the treated area may also become more sensitive during treatment. The radiographers will give you skin care advice.

There are some potential long-term (late) side effects of this type of pituitary radiotherapy.

As the normal pituitary gland is also receiving the radiation, there is a significant chance that it will become underactive at some point in the future (if it is not already). You will already be under the care of an endocrinologist who will monitor your hormone levels regularly. You may require hormone replacement medication.

Some parts of normal brain and the nerves of vision will also be receiving radiotherapy. There have been reports of eyesight disturbances and damage to normal brain following pituitary radiotherapy. These side effects are rare.

There are reports that there is an increased risk of stroke many years after pituitary radiotherapy.

Any radiotherapy treatment carries a very low risk of a second tumour in the brain developing in future.

Your doctor will discuss these possible side effects with you in more detail when you consent to treatment.

Use of steroid tablets

Often you will be given a short course of steroids to help reduce the effect of any swelling from the tumour which can be made temporarily worse with stereotactic radiotherapy. This is most commonly in the form of Dexamethasone.

Following your treatment

You will have a follow-up appointment with the brain radiotherapy oncology team 6 – 8 weeks after treatment.

Other information

Car parking

Car Park D is directly opposite the doors to the Cancer Centre on Mindelsohn Way. If you park here and bring in the ticket you have taken to access the car park, the radiographers on the treatment room will exchange this for a prepaid one so you can exit the car park. This has only been negotiated for patients who are attending for radiotherapy planning or treatment appointments so unfortunately, the radiographers will not be able to give you a ticket if you are attending for a follow-up appointment.

Contact Details

CyberKnife radiographers: Tel 0121 371 5060.

If there is no answer then please leave a message so one of the radiographers can call you back. This telephone will be checked regularly throughout the week but not checked at weekends.

Please use the space below to write down any questions you may have and bring this with you to your next appointment.

The Trust provides free monthly health talks on a variety of medical conditions and treatments. For more information visit www.uhb.nhs.uk/health-talks.htm

Radiotherapy

Queen Elizabeth Hospital Birmingham

Mindelsohn Way, Edgbaston, Birmingham B15 2GW

Telephone: 0121 627 2000

PI18/1594/02 Authors: R Simmons, H Benghiat, A Kapadia, P Sanghera
Date: July 2019 Review date: March 2021