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Radiotherapy

This information is about radiotherapy used in the treatment of lymphoma.

On this page

We have separate information about the topics in **bold font**. Please get in touch if you'd like to request copies or if you would like further information about any aspect of lymphoma. Phone 0808 808 5555 or email information@lymphoma-action.org.uk.

What is radiotherapy?

Radiotherapy is a treatment that destroys cancer cells with radiation (a type of energy).

Radiotherapy is a 'local' treatment. This means that it affects only the parts of your body being treated. It damages lymphoma cells in the area of the body treated. In time, they then die off.

Healthy cells surrounding the treatment area can also be affected by radiotherapy, but they are much more easily able to repair themselves.

Why is radiotherapy used to treat lymphoma?

Lymphoma cells are usually more sensitive to radiotherapy than many other types of cancer cell. This means that the dose of radiation needed to treat lymphoma is often lower than the dose needed for other types of cancers. A lower dose can help to reduce **side effects**.

Radiotherapy might be given with the aim of:

- getting rid of the lymphoma (**curative radiotherapy**)
- controlling symptoms of lymphoma (**palliative radiotherapy**).

> **It's important to realise that radiotherapy today is very different to radiotherapy given 20 years ago. We now have the technology and techniques to be able to deliver radiotherapy in a much more targeted way. We can use much lower doses, directed accurately, and leaving surrounding healthy areas out of the field of treatment. This means far fewer side effects. We can even deliver different doses to different parts of the body.**
>
> Professor George Mikhaeel, Consultant Clinical Oncologist.
> Extract taken from **our podcast: radiotherapy – offering a targeted approach to treatment**

You might be interested in listening to the full **podcast** in which Consultant Clinical Oncologist Professor George Mikhaeel explains what radiotherapy is and when it is used in the treatment of lymphoma.

Radiotherapy to try to get rid of your lymphoma (curative)

Many people have radiotherapy with the aim of destroying all of the lymphoma (curative treatment). The idea is to send the lymphoma into **remission** (no evidence of lymphoma in your body).

Your **medical team** plan your treatment based on lots of factors, including the **type** and **stage** of lymphoma you have.

You might have curative radiotherapy to treat:

- Some types of slow-growing (**low-grade**) lymphomas that are affecting fewer areas of your body ('**early stage**', stage 1 or 2). You might have only radiotherapy.
- Fast-growing (**high-grade**) lymphomas (stage 3 or 4), which are often treated with **chemotherapy** and then radiotherapy.

- Fast-growing (high-grade) lymphomas that are more widespread (**advanced stage**, stage 3 or 4). These are usually treated with chemotherapy, but you might then have some radiotherapy afterwards.

Read more about **types of lymphoma radiotherapy might be used to treat**.

Radiotherapy to control symptoms (palliative)

Sometimes, radiotherapy is given with the aim of reducing the size of the lymphoma to help control **symptoms** such as pain. This is known as 'palliative radiotherapy'.

Which types of lymphoma can radiotherapy treat?

> **Radiotherapy can be a very effective treatment when used alone. It can also be given in combination with chemotherapy to destroy cancer cells that have 'escaped' chemotherapy.**
> Prof George Mikhaeel, Consultant Clinical Oncologist
> Extract taken from **our podcast: radiotherapy – offering a targeted approach to treatment**

Hodgkin lymphoma

You might be treated with radiotherapy if you have:

- **classical Hodgkin lymphoma** that is at an **early stage**, after a course of chemotherapy.
- **classical Hodgkin lymphoma** that is at an **advanced stage**, sometimes if there are areas that seem not to have completely responded to chemotherapy.
- **nodular lymphocyte-predominant Hodgkin lymphoma** (NLPHL) that is at an early stage – radiotherapy alone is often recommended.

Non-Hodgkin lymphoma

Radiotherapy is used to treat many types of **non-Hodgkin lymphoma**. You might be treated with radiotherapy if you are affected by one of the following types of lymphoma:

Slow-growing (low-grade) non-Hodgkin lymphoma

- If the lymphoma is in just one area of your body, you might have **curative radiotherapy**.
- If the lymphoma is more widespread, you might have **palliative radiotherapy**.

Fast-growing (high-grade) lymphoma

- If the lymphoma is at an **early stage**, treatment often involves a course of chemotherapy followed by radiotherapy.
- If the lymphoma is more **advanced**, chemotherapy is usually given as a first treatment. In some cases, you might have radiotherapy afterwards. Radiotherapy might also be used to treat areas that have not responded completely to chemotherapy.

Doctors might choose radiotherapy where there is a high risk of the lymphoma coming back (relapsing) or for lymphomas that haven't responded to chemotherapy.
Prof George Mikhaeel, Consultant Clinical Oncologist
Extract taken from **our podcast: radiotherapy – offering a targeted approach to treatment**

Types of radiotherapy

Radiotherapy can be given in separate sessions (**fractions**) over around 4 weeks. Or it might be given in one single session.

Most radiotherapy is given by high energy X-rays (photons). These are made by a machine called an accelerator – often a linear accelerator, known as a LINAC). It can be given in single beams, multiple beams, and as intensity modulated radiotherapy (IMRT), which allows the dose to be tailored to the individual during the beam delivery.

In this section we cover the following types of radiotherapy, which can be used in the treatment of lymphoma:

- **Electron beam therapy**
- **Total body irradiation** (TBI)
- **Total skin electron radiotherapy** (TSET)
- **Proton beam therapy** (PBT)

Electron beam therapy

Electrons are tiny particles of radiation that can't travel far inside your body.

You might have electron beam therapy if the lymphoma is on or near to the surface or your skin, for example, **skin lymphoma**.

The radiotherapy (accelerator) machine that delivers the treatment has an 'applicator' connected to it. The applicator directs electrons to the area of your body to be treated. When the machine is set up, the applicator is brought very close to you and might touch you. However, you won't feel anything during the treatment.

You usually have a first 'mark-up' appointment of around 30 minutes. You are then given an appointment of about 10 to 15 minutes for each area of the body treated. Typically, electron beam therapy is given as separate treatments (fractions) over around 15 sessions.

Total body irradiation (TBI)

Total body irradiation (TBI) is a type of high energy X-ray radiotherapy given to the whole body.

If you need an **allogeneic (donor) stem cell transplant**, you might have TBI as part of your preparation for the transplant (**conditioning treatment**). It might be given as one dose, or you might have it twice a day over a number of days.

Total skin electron radiotherapy (TSET)

Total skin electron radiotherapy (or 'TSET', which stands for total skin electron therapy) uses electrons to treat the whole surface of your skin. It is sometimes called total skin electron irradiation (TSEI).

You might have this treatment for a type of **skin lymphoma** called **mycosis fungoides**. It's often given over 2 to 5 weeks.

Proton beam therapy (PBT)

Proton beam therapy (PBT) is a type of radiation therapy that uses charged particles called protons. These travel further in the body than electrons do. PBT can therefore be given directly to the cancer cells within your body.

In some cases, PBT reduces the risk of the long-term side effects (**late effects**) of radiotherapy. PBT is most useful for treating cancer in children, teenagers and young adults who have a higher risk of developing late effects. We have more information about **lymphoma in children and young people**.

PBT is not currently available on the NHS for adults (aged 25 or older) with lymphoma. This is because the current evidence does not suggest that PBT is a better treatment compared with current standard treatment. To be offered PBT on the NHS if you are aged 25 or older, a national panel of clinical experts considers the potential benefits of PBT to an individual.

PBT is available privately at some centres in the UK and in other countries. The exact techniques and treatments vary from centre to centre.

You can find out more about **PBT on the NHS website**.

Radiotherapy planning

Radiotherapy needs careful planning. This is to make it is as effective as possible while also minimising side effects. A range of radiography health professionals are involved in planning radiotherapy in collaboration with a consultant oncologist (the consultant with overall responsibility for your care).

Dose

The total dose of radiotherapy, measured in Gray (Gy), is split into separate treatments, known as 'fractions'. Doses given are within limits of radiation that are known to be safe.

How much radiotherapy you have depends on the aim of it.

- **Curative radiotherapy** is usually given over a few weeks. Treatment is spread out so that healthy cells have a chance to repair between fractions. Giving treatment in fractions also increases the likelihood of the treatment reaching the lymphoma cells at a time when they are most sensitive to radiotherapy.
- If you are having **palliative radiotherapy**, just one dose can be effective. However, sometimes, a longer course might be recommended.

With modern techniques, it's often possible to use a lower total dose of radiotherapy and to target lymphoma cells more accurately than in the past. This reduces the side effects caused by radiation to healthy cells while also successfully treating the lymphoma.

During planning, the radiotherapy team make sure that the right amount of radiotherapy is delivered to precisely the right place. They consider:

- Exactly where the lymphoma is. This area will receive most of your total dose of radiotherapy.
- Organs at risk. These are critical structures in the body such as the brain, heart, and salivary glands. Your treatment is planned to protect these organs from radiation, to prevent damage to them.

You won't receive radiotherapy to the rest of your body unless you are having **total body irradiation** (TBI) or **total skin electron radiotherapy** (TSET).

The radiotherapy planning process

Most radiotherapy treatment is planned using a **computed tomography (CT)** scan. You might hear this called a 'CT planning scan'. Images from the scan are transferred to a radiotherapy planning system to help plan your treatment.

You might have some permanent marks made to your skin (although these are not made on your face). Usually, these are two or three tiny dots of ink, just under the surface of your skin. The dots are used as stable reference points to help with getting you into the same position each time you have treatment.

You might also have a contrast agent, which is a type of dye given to make the CT image clearer. Usually, this is given as an injection in to one of your veins, or you might have it as a drink, depending on which area of your body is being treated.

If you're having radiotherapy to your head, neck, armpit or chest, you will probably have a thin plastic **mask** (shell) made. This helps keep you in the same position for each treatment, so that the treatment goes to exactly the right place.

If you're having radiotherapy to specific areas of your chest, you might be asked to take a deep breath in during your CT planning scan and treatment sessions. This technique is called 'deep inspiration breath hold'. It is used only in certain circumstances, to help reduce the impact of movement due to breathing on the area to be treated, and to reduce the dose of radiation to organs such as the heart. RESPIRE has information to help you **prepare for using the deep breath hold technique**.

The CT scan gives images that are a bit like a detailed 3D map. This shows:

- where the lymphoma is
- the exact positions of nearby tissues and organs in your body.

Your radiotherapy team and your **clinical oncologist** use this information and computer software to work out how to best direct the radiotherapy. Their goal is to treat the lymphoma while keeping radiation to the nearby parts of the body low.

Treatment mask or shell (for radiotherapy to the head and neck area)

If you have radiotherapy treatment for lymphoma to the head and neck area, you will probably have a thin plastic shell or mask made. The mask helps to:

- get you into the same position each time you have treatment
- keep you still during each treatment
- reduce the dose of radiation to surrounding structures in your body, which reduces short and long-term side effects.

The shell is usually made from plastic sheet. The plastic is softened in warm water for a couple of minutes to make it flexible, so that it can be shaped around you. The sheet is then gently laid over your face. You need to stay still while it cools and sets into the shape of your face. This takes a few minutes. Most people say that it doesn't feel unpleasant.

For consistency and for comfort during the process, you might be given a custom moulded cushion to go underneath your head and neck.

After your shell is made, the radiographers mark reference points on it to line the radiotherapy beams up with.

The thought of wearing a shell might seem daunting but most people find it OK, even if they feel nervous beforehand. Holes in the shell over your mouth let you breathe easily. Depending on the area being treated, extra holes can be cut out over your eyes and nose.

If you are worried about wearing a treatment mask, let your medical team know. They're used to talking through worries and concerns, and can give you suggestions to help you feel more relaxed.

> **I went on to have 15 sessions of radiotherapy to my head. I had a face mask made and was told to put my hand up if I wanted them to stop at any time. Because everything was explained so clearly, I managed to get through the treatment well.**
> Jacquie, diagnosed with diffuse large B-cell lymphoma (BLBCL)

You might also be interested in **Julian's story**, in which he talks about his experience of having radiotherapy.

What to expect during a radiotherapy session

When you have treatment, you'll usually be in a room that has a radiotherapy (accelerator) machine in it. Usually, you'll lie down on a specialist couch, made from solid carbon fibre.

The total time for each treatment session is typically around 10 to 20 minutes. Most of this time is spent getting you into position, while the radiotherapy treatment itself takes only a few minutes.

The radiotherapy team:

- Take around 5 to 10 minutes getting you into exactly the right position to receive the radiotherapy.
- Check that you're comfortable and go through with you what to expect.
- Dim the lights so that they can see the laser beams more easily. You might notice these as coloured beams coming from different points around the room – they guide the radiographer in getting you and the machine into the correct position.
- Turn on the lights fully and then leave the room.
- Switch on the radiotherapy machine. The machine delivers an accurate dose of radiation.
- Watch you on CCTV while you are having your treatment. They can see and hear you the whole time, and you can hear them too. If you need to call for attention, you can ask for it, or raise your hand.
- Sometimes take **X-ray** or **CT** images during the treatment session to check that you're in the correct position.
- Come back into the room at the end of the treatment session and help you get up.

Side effects of radiotherapy

Tiredness (**fatigue**) is a common side effect of radiotherapy. It usually starts to get better within a couple of weeks of finishing treatment.

The side effects you get from radiotherapy depend on which parts of your body receive the treatment, the **type** and **dose** of radiotherapy you have.

Your clinical oncologist and radiotherapy team will talk to you about **side effects** you might get. They can give you a guide as to when they're likely to start and how long they might go on for. They will also talk to you about any possible **late effects** you might have.

The side effects we cover in this information are a general guide.

Side effects of radiotherapy can include:

- tiredness (**fatigue**)
- **sore skin** in the area treated
- **sore mouth** (oral mucositis) if your head or neck area is treated
- **feeling and being sick** (nausea) if your brain, stomach or bowel is treated
- **diarrhoea** or urinary changes if your tummy or pelvis area is treated
- **hair loss** (which can be temporary) in areas of your body treated
- **reduced fertility**, if treatment is given to your pelvic area (just below your belly button).

Sun safety

Your skin might be more sensitive to ultraviolet (UV) rays after treatment. This means that you might burn more easily in the sun in the area of your skin treated with radiotherapy.

Your medical team will give you sun safety advice specific to your situation. In some cases, you won't receive much radiation to the skin and so will be advised to just follow **general sun safety precautions**.

How long after finishing radiotherapy will I see my consultant?

You should have a **follow-up** appointment with your consultant, usually around 6 to 8 weeks after finishing radiotherapy. Waiting a while after treatment gives time for side effects chance to settle as well as any inflammation caused by the radiotherapy.

If you are having **curative treatment**, you'll need to wait at least 3 months after finishing radiotherapy for a **PET scan**. Otherwise, the results might not be accurate as the treatment could still be working within your body.

What late effects might I have?

Late effects are health problems that first appear months or years after treatment has finished.

The late effects you might experience depend on the dose of the radiotherapy and which area of the body was treated. Your doctor should talk to you about possible late effects before you begin treatment.

> **Late effects don't necessarily mean that a person's quality of life will be impacted. Most people are able to continue to perform their usual activities of daily living.**
> Elizabeth Bentley, Team Leader Therapeutic Radiographer

Late effects can include:

- dental problems from an increased risk in tooth decay if you had radiotherapy to your head or neck
- eye problems, such as dry eyes and cataracts (cloudy patches in the lens of your eye that reduce your vision) if you've had radiotherapy to an area that includes one or both of your eyes
- heart problems, if your heart was in or near the area treated with radiotherapy
- dry mouth, if your salivary glands received radiotherapy
- **reduced fertility**, if you had radiotherapy to your tummy (abdomen) and the areas below your belly button (your pelvis)
- lung problems, leading to coughing and shortness of breath, if you had radiotherapy to your chest
- **thyroid problems**, leading to an underactive thyroid (**hypothyroidism**). This can make you feel cold and tired, and make you gain weight easily. The risk of developing hypothyroidism is higher in the first five years after treatment but remains increased after this time
- a small risk of developing another ('second') cancer many years later.

The management of late effects of radiotherapy (and cancer treatment as a whole) has become a greater focus of research. Many departments now have specialised late effects services. Even if the department you're treated at doesn't have its own service, they should be able to refer you to another regional service.

> **Speak to your hospital specialist team or GP for advice about long term effects of cancer treatment.**
> Elizabeth Bentley, Team Leader Therapeutic Radiographer

Follow-up after radiotherapy

After finishing your treatment for lymphoma, you will have **follow-up appointments**. During follow-up, you have conversations with your doctor, nurse or specialist therapeutic radiographer about your physical health and emotional wellbeing. You might also have a **physical examination** and **blood tests**.

Your schedule of follow-up appointments depends on several factors. These include the type of lymphoma you were treated for, how long it's been since you had treatment and whether you were treated as part of a **clinical trial** – clinical trials have their own schedule of follow-up.

Frequently asked questions about lymphoma and radiotherapy

In this section, we answer some of the questions we're often asked about lymphoma and radiotherapy. Speak to your medical team for advice specific to your situation.

Is radiotherapy safe?

Radiotherapy has been used for many years and is considered to be a safe treatment. Although it uses radiation, there are guidelines to make sure that only a safe amount of radiation is delivered to all organs in the treatment field.

Your individual treatment is designed to give you the lowest **dose** of radiation possible while effectively treating the lymphoma.

What are the risks of radiotherapy?

As with any treatment, there is a risk of **side effects** and **late effects** from radiotherapy. Your medical team will talk to you about these before you have treatment. You should also be given an opportunity to ask any questions you have.

Will radiotherapy make me radioactive?

Radiotherapy for lymphoma will not make you radioactive. People around you, including children, are not at any risk from being near to you after you've had treatment.

What clothing should I wear when I'm having radiotherapy?

You should be given information before having treatment about what to wear or what to avoid wearing. The general guidance is to wear loose-fitting, comfortable clothing made from natural fabrics (such as cotton or bamboo). Avoid wearing anything tight in the area being treated.

You'll need to remove clothing in the area being treated. However, you might be given a gown to wear during your treatment.

Can I take someone into the room with me when I have radiotherapy?

If you'd like to take a friend or family member with you to the appointment, they will need to wait outside the treatment room. This is so that they do not receive any radiation.

How long is a course of radiotherapy?

Most people who have radiotherapy have treatment Monday to Friday. The length of treatment can vary from a day to around 5 weeks. Don't worry if your schedule differs from this as your treatment plan is designed specifically for you.

Where and when will I have radiotherapy?

You need to go to the radiotherapy department for your **treatment to be planned** and each time you have radiotherapy.

Not all hospitals have a radiotherapy department, so you might need to travel a bit further to one that does. Generally, you should not have to travel more than 45 minutes to receive treatment.

Ask your medical team if they think you will be able to drive yourself home after treatment. If not, and you think you will find it difficult to get home, speak to them about any patient transport services available to you.

You might also be interested in **Macmillan Grants**, which are small one-off payments to help towards costs such as travelling to and from hospital.

Can I have radiotherapy if I'm pregnant?

Doctors generally advise waiting until after you have given birth before you have radiotherapy. If you need treatment urgently, they might advise you to go ahead with treatment while taking suitable precautions where possible. We have more information about **lymphoma during pregnancy**.

Can I breastfeed if I am having radiotherapy?

The safety of breastfeeding depends on which areas of your body receive treatment and the **type of radiotherapy** you have. Speak to your doctor if you are breastfeeding or plan to breastfeed so that they can offer advice.

If you have radiotherapy in addition to **chemotherapy** or other drugs, your doctors might advise you not to breastfeed during, and for a while after, treatment. Speak to them for advice if you think this could be difficult.

Is it safe to have radiotherapy if I have a pacemaker (cardiac rhythm device) or implantable cardioverter defibrillator (ICD)?

Generally, people who have a pacemaker or an implantable cardioverter defibrillator can have radiotherapy. However, the radiation can affect how the pacemaker or defibrillator works.

Depending upon the type of device and the dose of radiotherapy that will go to it, you might need extra checks. Sometimes, some devices might need to be switched off temporarily for each dose of treatment. Your radiotherapy team will work with pacemaker technicians for all of this to take place safely.

Will I need to take time out of work, studies or other responsibilities during treatment?

You are likely to need to take some time out of work, studies or other responsibilities during, and often for a little while after, **finishing treatment**. Ask your medical team for advice.

You might also be interested in our information about **day-to-day living**.

Will radiotherapy affect my fertility?

If radiotherapy is given to the area just below your belly button (pelvic area), there is a possibility of infertility. This could be temporary or permanent. Radiotherapy can affect the womb (uterus) as well as the ovaries, which can affect the ability to carry a pregnancy.

If you might want to have a child in the future, tell your medical team. They can discuss options for **preserving your fertility** and might refer you to a fertility specialist.

References

The full list of references for this page is available on our website. Alternatively, email **publications@lymphoma-action.org.uk** or call 01296 619409 if you would like a copy.

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