Radiotherapy for lymphoma

Radiotherapy has been used successfully in the treatment of lymphoma for over 50 years. In this article we aim to answer the questions you might have about this form of treatment:

- What is radiotherapy?
- What is the difference between radiotherapy and chemotherapy?
- How is radiotherapy used in the treatment of lymphoma?
- When is radiotherapy used in the treatment of lymphoma?
- What is radiotherapy planning?
- What will it be like to have the treatments?
- What are the side effects of radiotherapy?
- How can I look after myself while I am having radiotherapy?

Radiotherapy is used to treat many of the different types of lymphoma, including Hodgkin lymphoma and many forms of non-Hodgkin lymphoma. Nearly all of the information in this article is about radiotherapy for any lymphoma and it will be relevant to you whatever kind of lymphoma you have. Only on page 3 is there information specifically about radiotherapy for Hodgkin lymphoma and radiotherapy for non-Hodgkin lymphoma.

What is radiotherapy?

Radiotherapy is a treatment that uses radiation (high-energy X-rays) to destroy cells. The high-energy rays stop cells from dividing and because cancerous cells are dividing rapidly they are likely to be damaged and killed by radiation. Radiotherapy is used to treat a cancer when it is found in just one or two places or ‘sites’ in the body.

Lymphoma cells are particularly sensitive to radiation and this means that radiotherapy is an effective treatment for lymphoma. For certain lymphomas, especially if they are at an early stage, radiotherapy can cure the lymphoma. Radiotherapy also helps stop lymphoma from relapsing (coming back) after it has been treated with chemotherapy – it is known from research that it is rare for lymphoma to relapse in a part of the body that has already been given some radiotherapy.

Lymphoma cells are more sensitive to radiation than most other types of cancer cells (such as breast cancer or lung cancer cells for example). The dose of radiation needed to kill lymphoma cells is therefore comparatively low. This means that the damaging effects of the radiation on nearby healthy cells that are included in the treatment area are much less than with radiotherapy for most other types of cancer. The side effects therefore tend to be less severe than they are with radiotherapy for other cancers.
What is the difference between radiotherapy and chemotherapy?

People with lymphoma often receive both radiotherapy and chemotherapy. Both these forms of treatment are given to kill cancerous lymphoma cells, but they are given in different ways:

- Radiotherapy is a treatment that delivers radiation to an accurately defined area of the body; chemotherapy is treatment with drugs that enter your bloodstream and travel through the whole body.
- Radiotherapy is usually given daily over a few weeks (see page 5); chemotherapy is normally given at certain intervals over many months.
- Radiotherapy is usually given on an outpatient basis; chemotherapy often needs to be given in hospital.

How is radiotherapy used in the treatment of lymphoma?

In a few people, radiotherapy might be the only treatment needed. This would be most likely if the lymphoma was a low-grade or ‘indolent’ (slow-growing) type of lymphoma and at an early stage. Radiotherapy is usually given after chemotherapy. This has been shown to improve the results of treatment. Chemotherapy destroys small clusters of lymphoma cells that are situated some distance away from the enlarged lymph nodes. Radiotherapy is then the best way to ensure the lymphoma is completely eradicated from sites where it has become established.

When radiotherapy is used to treat lymphoma the radiation is targeted to enlarged lymph nodes and to any areas nearby where the doctor suspects there is lymphoma. Over the past few years doctors and researchers in this branch of medicine have been working to find the best ways of reducing the dose of radiation that is used and of targeting the lymphoma more and more accurately. Their aim is to reduce the side effects caused by radiation to the healthy cells while still treating the lymphoma effectively.

Most people will receive one of these types of radiotherapy:

- **involved-field radiotherapy** (IFRT), which treats an entire lymph node region such as the neck or the groins (a slightly more narrowly targeted version of this is called ‘involved-site radiotherapy’)
- **involved-node radiotherapy** (INRT), which treats just the affected lymph nodes, with a smaller margin round about. This needs to be planned very carefully to calculate the exact treatment required (for more information on radiotherapy planning see page 4).

The choice between these will depend on your type of lymphoma and the role of radiotherapy in your treatment programme. If radiotherapy is the only or main component of your treatment, then IFRT is usually given. If radiotherapy is being given after a full course of chemotherapy, INRT may be chosen.
The total dose of radiation you will be given is divided into several separate treatments of fractions. This is done so that your healthy cells have a chance to recover between treatments.

**When is radiotherapy used in the treatment of lymphoma?**

Radiotherapy is often used to treat lymphoma when it is found in just one or two areas of the body or when there was a large amount of lymphoma present in one or two places before chemotherapy was given.

Radiotherapy is usually given as a curative treatment for lymphoma, with the aim of destroying all of the lymphoma in the area being treated. This type of treatment is called curative radiotherapy. If it is not possible to cure the lymphoma, radiotherapy can be given to reduce the amount of lymphoma if it is causing symptoms such as pain or breathlessness. This is called palliative radiotherapy.

**Radiotherapy for Hodgkin lymphoma**

If you have the most common type of Hodgkin lymphoma, classical Hodgkin lymphoma, radiotherapy is nearly always used if the lymphoma is judged to be at an early stage when you are diagnosed. The radiotherapy is normally given with other treatments such as chemotherapy, usually after the chemotherapy.

Radiotherapy is used less commonly in people who have more advanced Hodgkin lymphoma when it is diagnosed, but it is sometimes used to treat any lymph nodes that are very enlarged or ‘bulky’. Radiotherapy is not often used for later treatments if Hodgkin lymphoma relapses.

In nodular lymphocyte-predominant Hodgkin lymphoma radiotherapy alone is the recommended treatment if the lymphoma is at an early stage.

**Radiotherapy for non-Hodgkin lymphoma**

Radiotherapy is used to treat many of the different types of non-Hodgkin lymphoma. It is used most commonly to treat high-grade or ‘aggressive’ (faster growing) non-Hodgkin lymphomas such as diffuse large B-cell lymphoma.

Radiotherapy is sometimes given on its own, usually when the non-Hodgkin lymphoma has been assessed as being at an early stage when it is diagnosed. More often, it is given together with other treatments such as chemotherapy. When it is given with chemotherapy the radiotherapy is usually given after the chemotherapy.

Radiotherapy is occasionally given if a low-grade or ‘indolent’ (slow-growing) non-Hodgkin lymphoma such as follicular lymphoma relapses and is in just one area of the body.
What is radiotherapy planning?

Once it has been agreed that you are to have a course of radiotherapy, you will be under the care of a clinical oncologist, a doctor who specialises in the treatment of cancer. They will decide exactly where to target the radiotherapy and will keep a check on you as your treatment proceeds. Not all hospitals have a radiotherapy department because the equipment used is expensive and the staff are specialised. You might therefore have to travel some distance for your course of treatment.

Radiotherapy has to be very carefully planned before it starts so that it is as effective as possible and so that side effects can be kept to a minimum. You will have X-rays and scans done and a machine called a simulator or ‘CT simulator’ uses these to make a precise three-dimensional map of your lymphoma and of nearby tissues and organs. (The ‘CT’ stands for ‘computed tomography’ and is a type of scan.)

All the information from the simulator will be collected and careful calculations are then made by dosimetrists – these are professionals who specialise in physics and ensure the safe delivery of radiation using specialist computer software. They work out the best arrangement of X-ray beams to treat the area that requires treatment while keeping the radiation dose that other parts of the body are exposed to as low as possible. They work within very carefully defined ‘dose constraints’ – meaning that the doses of radiation that your healthy tissues and organs are exposed to are limited to those known to be within safe limits. The final treatment plan has to be approved by the oncologist.

Most people with lymphoma will have their treatment planned using X-rays and scans in this way, but if your lymphoma is on the skin or near the skin surface you might not need to have scans as part of your treatment planning.

Marks are made on your skin that will be used each day to line up the X-ray beams on the treatment machine. Some of these marks will be made with ink, using pens that are like felt-tipped pens. You will be advised how to look after these marks. A few permanent marks will also have to be made. These are usually two or three tiny dots of ink, just under the surface of the skin, often referred to as ‘tattoos’.

If you are being treated for lymphoma in the head and neck area, it is likely that you will need a thin plastic shell made. Most shells are made in the simulator. This shell will help to keep your head still during treatment and will fit like a mask. They are very important in ensuring the radiation is targeted to precisely the right area. Having a shell means that you will not need to have marks drawn on your skin as all the reference marks are put onto the shell. Some people find wearing a shell quite daunting but the staff will try to make you feel as comfortable as possible to make it easier for you.

You might need to attend the radiotherapy department more than once over a few days for this planning process. Your medical team will advise you what the planning will involve as each hospital will have its own way of organising this phase of your care.
What happens when you have the treatments?

Radiotherapy is normally given daily over a period of 2–4 weeks, from Monday to Friday, usually as an outpatient, with a break over the weekend. This can vary, however, and it should be stressed that radiotherapy is tailor-made. People who are scheduled to receive a greater number of treatment days than others do not necessarily have a more serious condition. You will be given information on what to expect from your own medical team. They will explain when to come in, what clothes to wear and what will happen during your treatments.

You will usually be treated by a therapy radiographer using a machine called a 'linear accelerator'. This produces high-energy X-ray beams which deliver an accurate dose of radiation inside the body. The radiotherapy machine is housed in a special treatment room.

When it is time for the treatment to start you will be positioned carefully, usually lying down, under the machine. You will be asked to remain still. The radiographer might cover certain parts of your body that do not need treatment.

The room lights will be dimmed and you will probably notice a beam of light coming from the head of the machine, as well as some coloured laser beams coming from various points in the room. These are simply to assist the radiographer to get you and the machine in the correct position. The laser beams are not harmful in any way.

Before switching the machine on, the radiographers will turn the lights on fully and leave the room, but will be constantly monitoring you on closed-circuit television.

You will be able to hear them and they will hear you. The length of time each treatment session takes will only be about 10–20 minutes and most of this time is spent getting you into position. You will only be exposed to the radiation for a few minutes and you won’t feel anything. Radiotherapy does not make you radioactive and there will be no risk to people around you.
Electron therapy
Occasionally, if you have a skin lymphoma or lymphoma in lymph nodes very close to the surface, you may be treated with electron therapy (also called ‘electron beam therapy’). Electrons are also produced by the linear accelerator. They are tiny particles of radiation which travel only a short distance in the body and therefore allow the radiation to be kept near to the surface where it is needed.

When the linear accelerator is used for electrons, an applicator is attached to the head of the machine facing you. This is a metal applicator which will direct the electrons onto the site to be treated. When the machine is set up this will be brought very close to you and may even just touch you, but you will not feel anything while you have the treatment.

Will I have side effects?
It is not possible to say exactly what side effects you might experience. Everyone will be slightly different. Your medical team will advise you whether they expect you to have side effects from your particular treatment.

Any side effects will depend on several factors:
• the area of the body being treated
• the dose of radiation used and the timescale over which it is delivered
• the effects of any recent chemotherapy.

Side effects from radiotherapy can occur during treatment and then continue afterwards for a while – these are called ‘acute side effects’. Side effects can also occur much later on, long after the treatment is finished – these are called ‘late side effects’ or ‘late effects’.

Early side effects of radiotherapy
In general, the early or ‘acute’ side effects of radiotherapy tend to become more evident towards the end of your treatment and will probably be at a peak 1–2 weeks after the course has finished. The effects will start to wear off over the next few weeks.

You will probably be given written instructions from the medical team about what to expect and how to look after yourself during radiotherapy. Be sure to follow these instructions and to ask the team if there is anything you are not sure about. It is also important that you tell them about any side effects you are experiencing. There are usually things that can be done to help with side effects and they will prescribe medications if necessary. There are some tips on coping with side effects on pages 9–10.

Tiredness (fatigue)
Fatigue is one of the most common experiences for people with lymphoma. Fatigue is more than just ordinary tiredness – it not only means extreme tiredness, but can also mean that you find it difficult to concentrate or make decisions. You might find that you are short-tempered or emotional. Fatigue is caused by the lymphoma itself as well as
by the radiotherapy and other treatments you might have had. Be prepared for having less stamina and for needing additional rest during the day during your radiotherapy. Fatigue can build up, particularly towards the end of the treatment, and can last for several months.

**Sore skin**

The skin in the radiotherapy treatment area can become pink and a bit dry and itchy. If you have dark skin it might become darker. These changes are usually mild but occasionally, particularly in folds of skin such as under the breasts or in the groin, there might be more severe changes with peeling of the skin. Skin problems usually peak 1–2 weeks after the end of treatment and then start to heal over the next 2–4 weeks. It is important to take care of your skin during your treatment and on page 9 you will find a number of tips on how best to do this. Your therapy radiographer will also be able to advise you.

**Sore mouth**

If you are having radiotherapy to the head, neck or upper chest you may find that your mouth becomes dry and sore, which can make swallowing uncomfortable or painful. This happens because the radiation can damage the salivary glands, which are then unable to produce enough saliva. The dryness is at its most severe during the radiotherapy treatments and it can continue for some time afterwards. You will also be more at risk than usual of developing mouth infections such as oral thrush (a fungal infection) and cold sores and ulcers caused by the herpes simplex virus. If you develop a generalised inflammation and ulceration of the mouth this is called ‘mucositis’. This can be unpleasant but it will improve in time.

**Loss of taste or appetite**

Some people having radiotherapy report that their sense of taste has changed or reduced and that they don’t feel like eating. It is important to maintain your weight during radiotherapy because the treatment was planned on your shape and weight before treatment started. You might need to see the hospital dietitian for advice on how to keep your weight up.

**Feeling sick**

You may feel sick, particularly if your abdominal area is being treated. It may help to have anti-sickness medications prescribed before treatment starts.

**Diarrhoea**

If you are having radiotherapy to the abdominal or pelvic area you might find you experience stomach cramps or have to go to the toilet more often to open your bowels. This usually stops within a couple of weeks after radiotherapy finishes. Tell your medical team if you develop pain or diarrhoea. There are several medications that can be prescribed to help.
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Risk of infection and low blood counts
Sometimes your blood cell counts fall due to radiotherapy. If this occurs you will be more likely to get an infection until your count recovers. This is only likely to be a problem if you are having a large area of the spine or pelvis included in the radiation area.

Hair loss
You can lose hair in the area being treated – both where the X-ray beams enter your body and where they come out again (so you can lose hair on the back of your neck for example if you have radiotherapy to the neck area). This hair loss is usually temporary and hair will start to grow back a few months after the end of treatment.

We have separate information on many of these side effects, including fatigue, low blood counts, hair loss, mouth problems, nausea and vomiting, and bowel problems. Please ring our helpline (0808 808 5555) if you would like this information or if you would like to talk to someone about any concerns you have.

Late side effects of radiotherapy
With the relatively low doses of radiation used for treating lymphomas, major damage to the skin or internal organs is not expected. But there are some side effects that can develop months or years after treatment, including the risk of developing a second cancer, heart and thyroid problems and infertility. When you go to the follow-up clinic you will be checked for these late effects.

Risk of other developing a second cancer
Radiotherapy can itself cause cancer in small number of people, especially if they have other reasons for being at risk, for example if they smoke. Although this is a worrying possibility for people who are about to embark on radiotherapy, the benefits of having radiotherapy to cure or control your lymphoma usually far outweigh the risk of developing another cancer later on.

Women under the age of 35 who have received radiotherapy to an area of the chest that includes breast tissue have an increased risk of developing breast cancer later on. The risk varies according to the age you are when you receive radiotherapy treatment. Annual screening with mammography or magnetic resonance imaging (MRI) is now recommended, starting 8 years after treatment has ended. These tests are able to detect cancers at a very early stage.

In people who smoke, both men and women, there is an increase in the risk of lung cancer developing. It takes several years before this effect is seen. It is therefore strongly recommended that you stop smoking to reduce this risk.

If you are concerned about your risk of having a second cancer later on, discuss your concerns with the doctors in charge of your radiotherapy. They will explain the risks in your case and what screening will be organised for you in the future.
Hypothyroidism
Hypothyroidism means reduced activity of the thyroid gland and this can occur after radiotherapy to the neck. It can be detected by a simple blood test which should be carried out every year after you have had radiotherapy to the neck area. If this late side effect occurs, it is not serious and can be treated with thyroid supplement tablets.

Infertility
Radiotherapy will cause infertility if the testes or ovaries are in the area to be treated. If this is the case it may be possible for you to have sperm stored or the ovaries moved away from the beam. You should discuss this with your radiotherapy team.

Heart and vascular problems
There is some evidence that radiotherapy which includes the heart in the treatment area might put you at risk of developing heart failure in later life. This risk is greatest if you have also had certain chemotherapy agents as well. You should avoid increasing your risks of heart disease – giving up smoking is particularly important. Similarly, there is a small increase in the long-term risk of stroke if blood vessels in the neck are in the treatment area. Again, stopping smoking (and avoiding other people’s smoke) is very important.

We have separate information about late effects of cancer treatments, including articles on fertility and sexuality. Please ring our helpline (0808 808 5555) if you would like more information or if you would like to talk to someone about your lymphoma and its treatment.

Looking after yourself during radiotherapy

Looking after your skin
- To moisturise the skin only use the cream given to you by your medical team or a cream recommended by them. (E45 cream and aqueous creams are often recommended but check with your team.) Apply gently to the area treated and make sure there isn’t a layer of cream on your skin when you have treatment.
- Only use mild or baby soap and tepid water when you wash. Pat the area dry with a soft towel – don’t rub.
- Don’t use perfume, deodorant, perfumed soaps, talcum powder, lotions or sticking plaster on the area being treated by radiotherapy during your treatment and until any skin reaction has gone away.
- If you need to shave in the treatment area, only use an electric shaver.
- Avoid exposing the treated area to direct sunlight during and for some time after treatment. After treatment, if exposed to the sun, always use a high-factor sunscreen, preferably one suitable for sensitive skin.
- Avoid exposing the skin to extremes of temperatures such as ice packs, heat pads or hot-water bottles.
• Wearing loose clothing and clothing made from natural fibres over the treated area will help to minimise irritation.

Looking after your mouth
• Ask your dentist about the best methods of keeping your teeth and gums healthy. Control of dental plaque is particularly important at this time, as is reducing your sugar intake.
• Look out for symptoms or signs of infections such as thrush or herpes simplex virus infection (cold sores or ulcers). Your team might give you precautionary medicines to help prevent these infections. Always tell your team if your mouth is sore.
• Drink plenty (at least 2–3 litres a day).

If you develop a sore mouth or mouth ulcers
• Use a soft toothbrush. If tooth brushing becomes too painful, chlorhexidine mouthwash can be used as an alternative. Some mouthwashes contain agents which relieve pain too. Avoid alcohol-based mouthwashes.
• Some people find that sucking small pieces of ice is helpful.
• Avoid spicy and coarse foods such as crackers, nuts and raw vegetables if your mouth is sore.
• Avoid irritants such as alcohol and very hot or cold foods.

If your mouth is dry
• There are several ‘saliva substitutes’ available on prescription and from chemists. If you have your own teeth you should use a preparation containing fluoride.
• Some people find that taking frequent sips of water helps.
• Sugar-free chewing gum or sugar-free sweets sometimes help.

If you lose your appetite
• If large meals are a problem, eat small meals more frequently.
• You may need to consult a dietitian who might advise that you take dietary supplements.

If you have diarrhoea
• Changing your diet can help; it is probably best to seek advice about this from your team or from the hospital dietitian.
• Keep drinking lots of fluid so you don’t get dehydrated.
• Carry a ‘Just can’t wait’ card when you are out and about and worrying about access to toilets (for example the card produced by the Bladder and Bowel Foundation, see page 11 for their contact details).
Conclusion
You will probably be given written information from your medical team about what to expect and how to look after yourself during radiotherapy. Be sure to follow any instructions they give you and ask your team if there is anything you are unsure about. It is also important that they know about any side effects you are experiencing and whether these change during your treatment. There are usually things that can be done to help with these early side effects.

Some people experience late side effects of radiotherapy, but the benefit of radiotherapy for your lymphoma usually far outweighs the risk of these effects developing. You will be told what to look out for and will be checked for any sign of these during your follow-up appointments.

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Useful organisations and further information
Macmillan Cancer Support
① 0808 808 0000
www.macmillan.org.uk

CancerHelp UK
An information and advice service run by Cancer Research UK.
① 0808 800 4040
www.cancerresearchuk.org/cancer-help

Bladder and Bowel Foundation
Provides advice and support for people with bowel and bladder problems and produce a useful ‘Just can’t wait’ card for when you are out and about.
① General enquiries (and for the card): 01536 533255
② Helpline: 0845 345 0165
☆ info@bladderandbowelfoundation.org
www.bladderandbowelfoundation.org

Selected references


How we can help you

We provide:

- a free helpline providing information and emotional support ☎️ 0808 808 5555 (9am–6pm Mondays–Thursdays; 9am–5pm Fridays) or ✉️ information@lymphomas.org.uk
- free information sheets and booklets about lymphoma
- a website with forums and a chatroom – www.lymphomas.org.uk
- the opportunity to be put in touch with others affected by lymphoma through our buddy scheme
- a nationwide network of lymphoma support groups.

How you can help us

We continually strive to improve our information resources for people affected by lymphoma and we would be interested in any feedback you might have on this article. Please visit www.lymphomas.org.uk/feedback or email publications@lymphomas.org.uk if you have any comments. Alternatively please phone our helpline on 0808 808 5555.

We make every effort to ensure that the information we provide is accurate but it should not be relied upon to reflect the current state of medical research, which is constantly changing. If you are concerned about your health, you should consult your doctor.

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