

Understanding total body irradiation (TBI)

Cancer Services

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Information for patients

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What is total body irradiation (TBI)?

Total body irradiation (TBI) is radiotherapy (X-ray treatment) to the whole body.

Radiation has more effect on your bone marrow than on almost any other part of your body. This makes it very effective for patients undergoing bone marrow transplantation.

Having TBI as part of your treatment means that your marrow cells (both normal and abnormal) can be cleared to make way for the new marrow from your donor, more effectively and with lower doses of chemotherapy than if you just had chemotherapy by itself.

Radiotherapy is just like having an X-ray - you cannot feel anything happening. You will be staying on the Bone Marrow Transplant Unit (BMTU) and will come down to the Radiotherapy Department for a course of treatment over consecutive days. How many days you need to come to the Radiotherapy Department will be discussed with you before you start treatment.

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How is it done?

Before you come into hospital for your transplant, we need to prepare for your TBI by doing a 'dummy run' - this means giving you a small 'test' dose of radiation to the whole body.

Getting you into a stable position, and marking all the measuring points where we want them, takes half an hour or so the first time. This is done in one of our treatment rooms by therapy radiographers, physicists and your doctor.

You will have a chest X-ray taken here as well, to record the position of your arms and the measuring points on your chest. We will place a small sensor on your chest which will allow us to monitor your breathing. Before we take this X-ray we will ask you over the intercom to breathe out and we will take the X-ray. We may need to go in and out of the room, to move the markers on your skin and repeat the process. Once we are happy with the X-ray, we will place a small tattoo on your left side using a sterile needle. We will use this every day of your treatment to take measurements from.

Please note that we will only ask you to breathe out for the X-ray image and not when we are delivering the actual test dose or on the treatment days.

When all the measurements have been recorded we will be ready to deliver your test dose. This is a very low dose and should not cause any after effects.

Treatment is given using a radiotherapy machine (linear accelerator or LINAC) which can produce a wide X-ray beam to cover your whole body.

You will lie on your back, opposite the machine, on a trolley which is turned round half way through each treatment so you get half the dose from your right and half from your left, to make it even. Your arms will usually be folded across your chest and knees slightly bent but comfortably supported.

You will need to wear only a hospital gown and pants, and you must remove any jewellery. You will be covered as much as possible by a sheet or blanket and kept warm.

Several very small measuring devices will be taped onto your skin at points all down your left side, to measure how the radiation dose varies in different parts of your body. We take these measurement each time you have treatment, and use them to make adjustments so that the overall dose is as even as possible. Exactly the same points are used each time.

One way of adjusting the dose is to alter the position of your arms, so for one or more of your treatments you will have your arms above your head rather than across your chest.

Another way is to use a screen of varying thickness, which will be placed close to your side, between you and the treatment machine.

You will be in the treatment room on your own while the X-ray beam is on, and it takes about ten minutes to treat each side. You can bring a CD to listen to if you like.

What are the side effects of TBI?

Short-term side effects

Nausea, vomiting, diarrhoea and a sore mouth are common. These side effects could start after one treatment, but are more likely as treatment goes on. You will be offered preventative and ongoing medication to control these side effects

Occasionally there is swelling and discomfort of the salivary glands in your cheeks for a few days after the end of radiotherapy.

Food may taste different or tasteless, and this can take a while to return to normal.

A temporary redness or rash is common, and the skin may be dry and itchy. The following tips should help to reduce this:

- Wash or shower in warm water, and pat your skin dry with a soft towel
- Use a non-perfumed moisturiser to prevent dryness and itching
- Use extra sun screen if you are going out in the sun for at least six months after treatment.

You may experience some hair loss.

Tiredness and feeling weak from radiotherapy should last a week or two, but the chemotherapy effects add to this and you will not have much energy until your new marrow is working well. You may suffer from feeling sleepy for up to six weeks after treatment. This is usually a feeling of tiredness, but sometimes results in a constant desire to sleep. This will pass.

Long-term side effects

This form of treatment often leads to permanent infertility due to the effects of treatment on reproductive cells. You will have the opportunity to discuss this further with your doctor.

The lenses of the eyes are sensitive to radiation and about 20% of people get cataracts (where the lens goes cloudy and you cannot see through it properly). However, this does not usually happen until eighteen months or more after treatment. Cataracts can be removed and the rest of the eye should not be affected.

There is an increased risk of other tumours later in life for people who have had a transplant. This is partly due to chemotherapy and reduced immunity, and partly to radiotherapy. Radiotherapy is given to ensure the best chance of a cure.



Contact details

The member of the
Radiotherapy Team
looking after you is:

Contact number:

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