The ROYAL MARSDEN
NHS Foundation Trust

Patient information

Total body irradiation (TBI)

What is total body irradiation?

TBI is a radiotherapy treatment that is delivered by a linear accelerator and treats your entire body. The treatment is painless.

Your treatment decision

TBI is used alongside chemotherapy to prepare you to receive a bone marrow or stem cell transplant. Your individual case has been discussed in a meeting between the specialist doctors responsible for your care and they have recommended that you have this treatment.

This factsheet provides information about your treatment including what it involves and the possible side effects. We will ask you to sign a consent form that confirms that you wish to receive this treatment.

Treatment is usually given twice a day for three or four days. You will need to stay in hospital during this time and will be given the transplant the day after you finish treatment. Depending on the transplant option that has been recommended for you, treatment can occasionally be given in a single visit. After the treatment and transplant, you will be kept in isolation for several weeks to protect you from infection.

How does TBI work?

TBI and chemotherapy aim to suppress the immune system and prevent rejection of the transplanted donor bone marrow or stem cells. Additionally, TBI can destroy remaining cancer cells which will also increase the likelihood of the transplant being successful.

Planning your radiotherapy (pre-treatment)

In preparation for your TBI treatment, you will have an appointment in the Radiotherapy scanner. The scanner is staffed by Therapeutic Radiographers and specialist physics staff. At this appointment, we may make an individual support, similar to a bean bag, to help you stay in the same position for each treatment.

We will take a CT scan while you are in position and also take several other measurements and photographs. We will give you two pinprick tattoo marks on your chest and abdomen so that we can accurately deliver the treatment. The information taken during your appointment will be used to plan and deliver your treatment.

For further information, please see The Royal Marsden factsheet *Having a CT (Computerised Tomography) scan for radiotherapy planning.*

Revised: August 2023 Planned review: August 2026

How long will the planning take?

The whole process will take about an hour. After your planning session, we will confirm a time and date to start the radiotherapy treatment.

How is TBI given?

You will be treated twice each day - the treatments will be approximately six hours apart. The first will be at about 9am.

If you are having a reduced intensity transplant, you will only have one treatment. Before each radiotherapy treatment, we will give you medication to prevent nausea.

Receiving your treatment

- Treatment is delivered by Therapeutic Radiographers.
- You will need to remove your clothes from your top half and any other clothes with metal in them, as well as any jewellery. It is best to wear some loose-fitting bottoms such as pyjamas or a tracksuit.
- You will be positioned as you were for the planning session, with the support made for you at that time. You will have treatment delivered from one side and then the couch will be turned around so you can then have treatment from the other side. You will not see or feel anything during the treatment.
- Each treatment will take approximately 50 minutes in total. On the first day it will be a little longer as we will take extra measurements to check the treatment. You will need to keep still during this time.
- If you wish, you can bring an audio book, podcast or music to listen to during the treatment. You will not be able to use live streaming in the treatment room, but we can plug in a personal device if you have downloaded something to listen to.
- The radiographers will be in the control area during the treatment but they can see you, hear you and speak to you at all times.

Are there any side effects to TBI?

You may experience some side effects after this type of treatment. Some of these side effects may also be due to your chemotherapy.

Early side effects:

Week 1

- **Swelling of the face** (like mumps) – inflammation of your parotid glands may cause some jaw stiffness which usually settles after a few hours. Parotid glands produce saliva and they may stop working for a few weeks after TBI. This can make eating uncomfortable. Drinking more and choosing moist foods may help.
- **Redness of the skin** – this should settle a couple of days after TBI has finished.
- **Diarrhoea** – this can happen during or after the course of TBI.
- **Abdominal pain** – you may experience some abdominal pain or discomfort.

- **Nausea and vomiting** – vomiting is rarely a problem with TBI as effective medication is given in advance to control it.
- **Sore mouth** – the inside of your mouth, your tongue and throat may become inflamed. Keep your mouth clean and healthy by drinking plenty of fluids and carrying out good oral hygiene.
- **Loss of taste** – you may experience a loss or change in taste.
- **Hoarseness of voice**

You may not have all of these side effects but please let your team know if you do experience any so that we can either give you medication or change your medication. All these early side effects will be temporary.

Late side effects

Week 2

- **Hair loss** – the hair on your head and body will fall out 10-14 days after TBI, although you may have already lost it as a result of chemotherapy. It will start growing back after several weeks. You may not lose your body hair if you receive the reduced intensity single treatment type of TBI.

Month 1-3

- **Excessive fatigue (tiredness)** – you may become very tired, lethargic and drowsy for long periods and at different times of the day or night. This is called somnolence syndrome and usually lasts about two to three weeks.

Month 3-4

- **Pneumonitis** – this is inflammation of the lungs which may cause a dry cough or breathlessness. Let your doctor know if this happens as you may need a course of steroids.

Long-term risks:

- **Cataracts** – clouding of the lenses in the eyes causing blurred vision. These can be treated with a small operation.
- **Infertility** – it is likely that the chemotherapy you have already received will have caused infertility. The combination of TBI and chemotherapy will almost certainly result in infertility. You will have discussed this with your doctor during your consent to treatment.
- **Sexual function** - there may be a loss of libido, early onset menopause and some sexual dysfunction. Please discuss any problems with your clinical nurse specialist or doctor.
- **Hormonal changes** – including hypothyroidism and, in children, reduced growth hormone. These may need treatment with replacement medication.
- **Second cancers** – 2-5% of people having chemotherapy and TBI may develop another cancer within the next 10 to 20 years.
- **Risk of infection** – you may suffer from a loss of function of your spleen resulting in the need for long term antibiotics.
- **Cardiovascular problems** – there is a slight increased risk of heart attack and stroke.

- **Intellectual, heart, kidney, bowel or bladder** problems – these have sometimes been reported
- **Damage to blood vessels** – this may lead to strokes or other vascular problems.

If you have any questions or concerns about this treatment, you can contact the switchboard: 020 7352 8171 and ask for your consultant's secretary (Monday to Friday, 9am–5pm)

Your Radiotherapy Consultant is _____

Alternatively, please call:

The Royal Marsden Macmillan Hotline: 020 8915 6899

(available 24 hours a day, 7 days a week)

If you need to change your radiotherapy appointments, please phone:

The radiotherapy bookings team: 020 8915 6018

(Monday to Friday, 9am–5pm)