Introduction

This leaflet is for people who have been recommended total body irradiation.

Total body irradiation (TBI) is a form of radiotherapy given as part of the treatment (“conditioning”) with chemotherapy prior to a bone marrow transplant. TBI reduces the risk of the transplant being rejected by your body. It also destroys any residual cancer cells and allows bone marrow cells to seed and grow. Radiotherapy is given in a number of treatments or fractions.

Your treatment

You will be admitted to the Haematology Ward about a week before your bone marrow transplant. Conditioning chemotherapy will be given before the TBI which usually starts on a Monday.

Depending on your treatment plan, you will either receive twice daily treatments for four days (given six hours apart to allow normal tissue time to recover) or less frequently as a single, one off treatment. You will be advised which treatment you will have when you meet your Oncology Team. The TBI continues until the day before you receive the infusion of stem cells or bone marrow.

Please do not wear any jewellery when you attend for radiotherapy.
Treatment planning /test dose

So you can receive your treatment we need to create a treatment plan which is individual to you. In order to obtain the information required we ask you to come to a planning appointment which takes place in the room where you will have your treatment.

During this visit, the radiographers will measure the thickness of various parts of your body and place small radiation monitors (called diodes or TLDs) on various parts of your body. Additional padding material called bolus will be positioned to even up the thickness of some parts of your body (e.g. between your knees and over your chest and neck).

A very small dose of radiotherapy is delivered on this occasion which allows us to plan the following treatments accurately. The lights in the room will dim for a few minutes while the radiographers place the treatment couch in the right position. Once in the correct position the staff will leave you alone in the room, to prevent them from being exposed to the radiation. They are just outside the room and will be watching you via a camera whilst the radiotherapy is given. The couch will move to allow the treatment to be given to one half of the body and then will turn round (180 degrees) to treat the other side.

The planning session will take about one and a half hours in total.

Radiotherapy treatment

You will be placed in the same position as you did for the test dose and the same process followed, when you have your treatment. Half an hour is taken up with reproducing the exact position you were in for your test dose. The actual treatment takes about 30 minutes, 15 minutes to each side.
Early effects of radiotherapy

Radiotherapy treatment is painless. However, there are some side effects which are associated with radiotherapy and you may notice one or more of them gradually developing over the course of treatment. Your chemotherapy can also cause these symptoms, so they may not be due to the radiotherapy alone. You may, understandably, feel alarmed by the side effects listed here and it is difficult to predict how each individual is going to react to the treatment.

**Tiredness**

You may begin to feel quite tired during your treatment. This will gradually ease a few weeks after you have finished your treatment. Try to rest and sleep as much as possible. Several weeks after TBI you may feel the need to sleep for long periods of the day. This is known as “hypersomnolence”. This will gradually resolve.

**Skin care**

The skin will be more sensitive and may become red or pink similar to sunburn. This maybe more noticeable in the folds of skin and areas covered by the bolus area. The skin care information sheet will tell you how to care for your skin to reduce the reaction and discomfort. Please tell your nurse if an area of skin becomes broken or sore and they will suggest specific lotions and dressing to keep the area clean.

You may feel more comfortable in loose fitting clothes preferably with cotton next to your skin during this time.

**Hair loss**

You may already have lost your hair with chemotherapy otherwise your hair usually begins to fall out about fifteen days after radiotherapy. This includes loss of all body hair. This is usually temporary, but in a small minority of patients it may not grow back. It is likely to take six months to return to its normal
condition and there maybe a change in the texture, or colour after treatment.

**Nausea and vomiting**
You may find the treatment makes you feel sick, although this is more likely initially to be from the chemotherapy. Anti sickness drugs will be prescribed to help relieve these symptoms. Drink plenty of fluids so as to not become dehydrated.

**Diarrhoea**
This is a fairly common side effect of the treatment and medication can be prescribed to relieve these symptoms. Drink plenty of fluids so as not to become dehydrated.

**Sore mouth**
The inside of your mouth and throat may become swollen and sore causing changes in taste and difficulty in swallowing food and drink, which can lead to loss of appetite and weight. You may also notice a swelling in your neck – pain killers and mouthwashes can be prescribed for this. This will settle down in a couple of weeks after your treatment is completed.

Good oral hygiene is very important. Use the recommended mouthwash after each meal. Brush your teeth with a soft toothbrush in order to prevent damage to the lining of your mouth. Keep your lips moist by using a paraffin-based product.

Avoid hot, spicy food, alcohol and smoking. They can make the dryness and soreness worse. Frequent drinks will help keep the mouth moist. Artificial saliva is available.

**Bone marrow depression**
This is also a side effect of chemotherapy. About seven to ten days after treatment your bone marrow will begin to die. This will result in low blood cell counts; a low red cell count making you prone to anaemia, low white cell count making you prone to infection and a low platelet count making you prone to bleeding. You will need to have antibiotics, blood and platelet transfusions.
**Bladder**
You may feel the urge to go more often or the need to pass urine urgently. Please tell the doctors or nurses if this happens.

**Veno-occlusive disease**
This is a disease in which inflammation can develop in the small veins in the liver. It can be caused by TBI and chemotherapy. It can result in a painful liver, fluid retention, and jaundice. To try and prevent this happening you will be given a drug called heparin by continuous infusion down your hickman line. You will start the heparin on the day you are admitted to hospital and continue it for most of your stay.

**Sexuality**
**Women:** TBI will cause infertility and early permanent menopause, this will happen gradually after your treatment. You will be referred to an endocrinologist after transplant for review and hormone replacement therapy maybe prescribed.

Currently it is not possible to store female eggs for future use but if fertility is important then you will be referred for consideration of ovarian tissue storage. Even though sterility is likely to occur, you must continue to use birth control.

**Men:** Radiotherapy to the testes almost always causes infertility. Before treatment begins you will be asked if you wish to store a sample of sperm for future use. The sperm can be saved for several years in a frozen form.
Late effects of radiotherapy

Long term side effects can occur many months to years after radiotherapy has finished. These late side effects are hard to predict and unfortunately if they do occur can be permanent.

**Emotion**

It can be an emotional time, having treatment. You may feel anxious and uncertain and find that the ongoing tiredness and feelings are holding you back. This is natural and it is important to give yourself time to adjust – recovery time is individual.

Support may be available from family and friends. It might help you to continue some hobbies you enjoy whilst in hospital. Your bone marrow nurse practitioners may be a source of support and advice regarding the impact of your experience on your emotions and relationships (including sexual relationships) and may refer you to local counselling services. Both you and those around you can find advice and support from the local Maggie’s Centre (see overleaf) and other organisations. They will have information on local support groups, counselling services and complimentary therapies.

**Skin changes**

You may begin washing normally once your skin no longer looks red or feels itchy.

The skin is more sensitive and should not be exposed to direct sunlight or cold winds, for at least one year but continue taking extra care after this. We recommend using a high factor sun cream, wear a hat and a long sleeved T shirt when you go out in the sun.

**Cataracts**

This is the clouding of the lens in the eye. This may occur in five percent of patients undergoing TBI and usually occurs one and a half to five years after treatment. It can be corrected by a relatively minor operation to restore vision.
**Lung**

TBI can cause inflammation (pneumonitis) and scarring (fibrosis) of the lung. It can result in breathlessness, coughing, wheezing and reduced lung volume. Your lung function will be monitored regularly. You will also be given antibiotics following transplant to minimise the risk of infection. It may be possible to learn breathing exercises or use medication that will help reduce your breathlessness.

**Under active thyroid (hypothyroidism)**

Blood tests can confirm if your thyroid is working properly. If not you may require thyroxine tablets to replace the normal hormone produced by the thyroid gland.

**Second cancers**

Having radiotherapy can increase your risk of developing another cancer many years later. We think the risk is about one percent for every decade of life expectancy, so at most five percent lifetime risk.

**After treatment ends**

Any symptoms that have developed during treatment will wear off a few weeks after it ends. Once you have completed the course of radiotherapy and had your transplant you will be reviewed, regularly, by your haematology team.
How to contact us

If you have any queries **during** your radiotherapy please do not hesitate to ask a therapy radiographer treating you or contact the Haematology Ward: **01865 235048/9**

**Additional information and support**
You may now find it helpful to read the booklet in the Macmillan Series entitled ‘**Coping with the side effects of chemotherapy**’.

This booklet and other fact sheets are available from Macmillan Cancer Support, free of charge. www.macmillan.org.uk.

Publications order line **0800 500 800**

**Local Advice and Support can be obtained from**
**Maggie’s Cancer Information Centre**
The Churchill Hospital
Old Road
Headington
Oxford OX3 7LJ

Telephone: 01865 225690 (Mon to Fri. 9.30am-4.30pm)

Website www.maggiescentres.org

**For benefits advice:**
Telephone: 01865 225689
If you need an interpreter or need a document in another language, large print, Braille or audio version, please call 01865 221473 or email PALSJR@ouh.nhs.uk