Understanding
Total Body Irradiation (TBI)

Information for Patients and Caregivers

Read this guide to learn:

- What is TBI and why do you need it?
- How can you prepare for TBI?
- What will happen each TBI session?
- What are the side effects from TBI?

The Leukemia/Bone Marrow Transplant Program of BC

What is Total Body Irradiation?

Radiation is a treatment that uses high energy rays (gamma rays), similar to x-rays, to destroy or damage cancer cells. It kills cancer cells by damaging their DNA. Cancer cells whose DNA is damaged beyond repair stop dividing or die.

Radiation to the whole body is called total body irradiation or TBI.

Why do I need Total Body Irradiation?

Total Body irradiation is given as a part of your conditioning treatment before your stem cell transplant. As cancer cells circulate throughout your body, your entire body needs to be treated with radiation. Conditioning treatment is used to:

- destroy any remaining cancer cells in your body;
- create space for the new stem cells
- In allogeneic transplants: TBI is also used to lower or suppress your immune system. This helps to prevent rejection of your new donated stem cells.

What will happen on my first consultation visit to the Radiation Centre?

Before being admitted to hospital, you will meet with your Radiation health care team at the BC Cancer Vancouver Centre. This is a team of Radiation Oncology doctors, therapists and physicists who will teach you about your TBI treatment and answer any questions you may have.

After meeting with your Radiation Oncologist, you will go to the treatment room and meet with the Radiation therapists. To plan your treatment, you will have some measurements taken and temporary marks will be put on your skin. These marks will ensure you are placed in the same position each day for treatment. This process should take about 30 minutes.

Next, the team will arrange for a CT simulator to take pictures of your entire body. The CT simulator is a CT scanner with special computer software. It sends the images from your scan to a treatment planning system to allow your team to plan your radiation treatment. The CT scanner plans your treatment; it does not look for cancer cells.

Our radiation therapists will explain this whole procedure to you and will answer any questions you may have.

How can I prepare for my treatment sessions?

- Wear loose fitting clothing such as pajamas that open at the front. Make sure they do not have any metal zippers or rivets.
- Try to remove all metal objects such as jewelry, safety pins, or eye glasses before TBI treatments.
- If you are feeling sick to your stomach before treatment, ask your nurse for an anti-nausea medication before your appointment.
- Bring your mobile phone or MP3 player if you want to listen to music during your treatment.
- There are no diet or activity restrictions.

How many radiation treatments will I receive?

The number of treatments is a complex formula based on your disease type, location, your general health, and the aim of the treatment. These treatments usually happen 2 times a day for 3 days in a row. This is a total of 6 treatments.

If you have 2 treatments within a day, the appointments are usually at 8am and 2pm. The minimum time between treatments is 6 hours.

Your transplant team has recommended _____ treatments.

You will receive radiation treatment _____ time(s) every day.

You will receive radiation treatment for _____ day/days in a row.

What will happen during each TBI treatment?

How will I get there?

For each radiation treatment, our team will arrange for you to be taken on a stretcher to your radiation treatments and bring you back to your room after each session. The trip to the Radiation Centre uses an underground tunnel that connects Vancouver General Hospital to the BC Cancer Centre. Taking the tunnel can take 10-15 minutes; it is easiest to close your eyes during this trip and try to rest.

How long will the appointments take?

Your treatment appointments are about 1 hour long. During this 1 hour appointment, most of the time is used to make sure that you are in the right position for treatment. The actual time it takes to deliver the treatment is about 15 to 20 minutes.

What can I expect during my Total Body Irradiation treatments?

- Radiation treatment is not painful. It is just like having an x-ray.
- The x-ray beam is like a beam of light. It fans or sweeps up and down your body.
- Two radiation therapists and a physicist are present for your first treatment. Using the marks that were made on your body, the radiation therapists will place you in the correct position to receive radiation treatment.
- You will lie on a stretcher close to the floor during TBI treatment. First you will be treated while lying on your back. You will then turn over and lie on your stomach to receive treatment. You will need to stay very still the whole time.
- The radiation beams come from a large machine. The machine does not touch you and your stretcher does not move.
- The radiation beams will move from your head to your feet in a sweeping motion.
- Sometimes the machine will make a loud whooshing sound, this is normal.
- You and your clothes won't become radioactive during or after the treatments. You can't pass the radiation to other people. Pregnant women and children are safe around you.

TBI Side Effects:

Radiation not only kills the growth of cancer cells, it can also affect nearby healthy cells. Damage to these healthy cells can cause side effects. Generally, radiation side effects and chemotherapy side effects are similar and hard to tell apart. Radiation can sometimes make the side effects from chemotherapy feel worse.

What are the short term side effects from TBI?

- Nausea and vomiting
- Indigestion, heartburn
- Fatigue
- Hair loss
- Skin Changes: Your skin may become slightly flushed and itchy within a few hours after treatment. Some patients mention it feels like a sunburn.

To protect your skin:

- You may wash or shower as usual and gently pat your skin dry.
- Try not to rub or scratch the area.
- Wear loose clothes made of cotton or soft fabrics.
- Use gentle moisturizing creams on your skin 3 or 4 times a day.

What are the long term side effects from TBI?

Some side effects can happen months or years after your treatment and last for a long time. These include:

- Infertility (not able to have a biological child).
    - Women: TBI most often will cause infertility and early menopause. This will happen gradually after your treatment and your doctor may advise hormone replacement therapy. Permanent failure of ovarian function occurs often in women over 25 years old; speak with your doctor well in advance about any available options to preserve your eggs before treatment starts.
    - Men: TBI may lead to infertility in men, and libido may temporarily be reduced. Testosterone levels should return to normal 6 months after your radiation. Because of the damage to sperm from treatment, contraception should be used to avoid pregnancy for at least a year after the transplant.
- Having lower amounts of thyroid hormones. Your doctor will check your thyroid hormone levels during your yearly check-ups.
- There is a very small risk of developing a new cancer years later.
- There is an extremely small risk of developing damage to the brain called "leukoencephalopathy". It is a very rare condition but can lead to severe brain damage and learning disabilities.

Please see your **"Supporting You through Treatment"** booklet for suggestions on managing any side effects you experience from TBI.

We believe that the potential benefit of your radiotherapy treatment outweighs any longer term risks involved. For any further questions, please talk to your health care team.

This booklet was made in partnership with the Radiation Oncology Team at the BC Cancer Vancouver Centre. Information is subject to change and does not replace medical advice given to you by your health care team. Author: Amy Healy 06/2019