What is Total Body Irradiation?

Many marrow transplant patients undergo, in addition to chemotherapy, total body irradiation (TBI) to prepare for their transplants.

TBI is radiation delivered in varying doses from a linear accelerator. TBI offers optimal tumor kill, because it penetrates the central nervous system, along with other privileged sites. The desired effects of TBI is to destroy cancer cells along with a suppressed immune systems that helps prevent rejection of the bone marrow graft. TBI may be delivered up to 2-3 times a day & up to 3-4 days in a row. The VA radiation treatment center is located in back of the main hospital in a separate building across from the Fischer House. There you will be taken to a room which contains a machine used to administer the radiation. There is an intercom and a video system in the room which allows you to be monitored & communicate with the radiation technician and nurse. You will be monitored for the entire procedure. During the procedure, you will be required to stay in a semi-sitting position, resting on a seat similar to a bicycle seat. If you are unable to stand for the entire procedure, it may be stopped and restarted allowing for you to take a break if needed. You receive radiation both to your front and back in separate sessions. There will be a break between sessions. An acrylic shield will be placed between you and the machine that delivers the radiation to protect your lungs and thyroid from radiation.

This procedure is not painful and most patients do not report any unusual sensations. However, there are side effects with TBI. These will be closely monitored, and you will be given treatment to minimize the discomfort associated with them.

Long term side effects

Cataracts:
The lens of the eye is very sensitive to radiation. Cataracts may form 1-3 years after treatment, due to damage to the lens. This can be surgically repaired, if necessary.

Fertility:
Radiation decreases ovarian function in women and they may stop menstruating. They may also experience other symptoms of menopause, including vaginal itching, burning and dryness. In men, radiation decreases sperm count and effectiveness. Radiation may cause genetic mutations in both sperm and ovum. You should discuss birth control measures and concerns with your doctor. This does not mean you would be unable to conceive a child. Men often bank sperm before treatment, due to the increased incidence of sterility.

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SIDE EFFECTS

Nausea/Vomiting/Diarrhea:

Nausea, vomiting & diarrhea are common side effects caused by the destruction & increased sensitivity of the cells that line the esophagus, stomach and intestinal tract. These side effects will normally resolve once you have engrafted. You will be given medications before each scheduled treatment and as needed at the time of the treatment. If you are unable to meet your nutritional needs, you will receive them through your IV.

Alopecia (Hair Loss):

TBI results in loss of most body hair within 1-2 weeks of the treatment. This happens because the epidermal layer of skin, which holds the hair roots in place, is destroyed and the hair follicle dies. Your hair will begin to grow again in 2-3 months after treatment. The amount of hair that grows back depends upon how much radiation and the type and amount of chemotherapy you receive. Your scalp may be tender and you should protect it from the sun.

Fatigue:

Fatigue is a very common side effect of TBI & is caused by the increased demand for energy to repair damaged cells. In addition, you are not obtaining your optimal nutritional requirements, and some medications you are taking for other side effects may decrease your energy level.

Skin Problems:

You may experience skin irritation. The skin may become reddened, dry, itchy or tanned. You may develop a condition known as "moist reaction" in areas where there are skin folds (armpits, groin, and breasts). These areas become very sore and should be brought to the attention of the medical staff. Medicated lotions, powders and other measures are used to treat your skin irritations. Skin conditions should begin to heal 1-3 weeks after TBI treatment. Some helpful hints: wear loose fitting clothes, don't rub/scratch the affected areas, avoid putting anything hot or cold on the areas, don't use lotions, powders, creams or body oils unless prescribed by your doctor and avoid direct sunlight.

Mucositis:

Mucositis is the inflammation of the GI tract (including your mouth, throat, stomach, intestines & bowels). Your saliva may become thick, ropy & sticky. You may develop sores in your mouth called ulcers; often these become open & bleed. You will be instructed in depth by MTU staff on how to care for your mouth & ways to minimize discomfort. Pain medications will be provided, as needed, to manage the pain. Some degree of mucositis persists up to one month after transplant.

Decreased Blood Counts:

White blood cells (WBC's) are very sensitive to radiation. They fall rapidly from normal levels to very low levels. Your platelets and hematocrit will fall more slowly, over 10-14 days after TBI. Low levels of WBC's leave the body vulnerable to infections. Low platelet levels increase the risk of bleeding. During this time, you are kept on the MTU unit, where your room is specifically designed to minimize your risk of getting an infection. You will receive platelets and packed red blood cells to maintain acceptable cell levels.

Emotional:

Nearly all patients who receive treatment for cancer feel some degree of emotional upset. It is not unusual to feel either depressed, afraid, angry, frustrated, alone and/or helpless at times. Radiation may influence your emotional state indirectly through fatigue, hormone imbalance, and other side effects. However, the treatment itself is not a direct cause of mental distress. A chaplain and psychologist are on staff and available to you and your family during any phase of treatment.