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UNDERSTANDING RADIATION THERAPY

What is radiation therapy?
Types of radiation therapy
How do I prepare for treatment?

UNDERSTANDING RADIATION THERAPY

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Introduction

This booklet has been developed to help you learn more about radiation therapy, one of the main types of treatment for cancer. It discusses what radiation therapy is, what it is used for, the expected side effects and how to manage it.

Each person undergoing treatment reacts differently. The severity of side effects may vary between people. Some people will have no side effects while others may have a few. However, many side effects can be controlled or reduced. Knowing what might occur may help you cope better and assist you in making decisions about treatment.

We cannot advise about the best treatment for you. You need to discuss this with your own doctor. However, we hope the information in this booklet will answer some of the questions you may have and help you think about the questions you want to ask your own doctor. This booklet only serves as a guide and its contents are not to be taken as medical advice.

If you find this booklet helpful, share it with your family and friends. And if there is any information you are seeking that is not covered here, please contact the Cancer Helpline at 6225 5655 to speak with a nurse counsellor. You can also reach them by email: cancerhelpline@nccs.com.sg

Other cancer information booklets are available from the National Cancer Centre Cancer Education and Information Services. You can contact the Cancer Helpline to request for a copy. For an electronic version of this booklet, please visit National Cancer Centre Singapore's website: <https://www.nccs.com.sg>

WHAT IS CANCER?

Cancer is a disease of body cells. Normal cells grow, divide and replace themselves in an orderly manner. Under normal conditions, your body constantly replaces cells that are lost either naturally or through injury. The body is able to balance the rate of cell loss with new cell formation. Sometimes, this does not work well, when some cells multiply out of control. Cancer develops when these cells divide too rapidly and grow without any order. This uncontrolled growth may grow into a lump called a tumour.

There are generally two types of tumours. One is able to grow in its place of origin and does not destroy the surrounding normal tissue. They do not spread to other parts of the body. They are termed as benign (non-cancerous) tumours.

On the other hand, there are tumours which are more aggressive and can destroy surrounding tissues. They also spread to other parts of the body eg. lungs, liver, brain, bones, etc. These are known as malignant (cancerous) tumours.

HOW IS CANCER TREATED?

There are various types of cancer treatment. These include surgery, radiation therapy, chemotherapy, hormonal therapy, and immunotherapy. The treatment chosen for your cancer depends on many factors. These include age, general health, the type of cancer, origin of the cancer, the severity or stage of the cancer. Depending on these factors, the most effective and appropriate treatment will be advised. The decision on the type of cancer treatment(s) you may receive will be made between you and your doctor, after discussion, on the need for treatment, the aim of the treatment, the possible side effects and other available treatment options. It may consist of only one type of treatment or a combination of treatments.

Surgery physically removes the tumour. Surgeons that specializes in removal of tumors are also known as Surgical Oncologists.

Chemotherapy uses anti-cancer drugs to destroy cancer cells. These drugs stop cancer cells from growing and reproducing themselves. Chemotherapy can be used before surgery to shrink the tumour or after surgery to prevent more cancer cells from growing. Sometimes, chemotherapy is used together with radiation therapy to increase the efficacy of treatment. The doctor who prescribes the chemotherapy drugs to you is also known as a Medical Oncologist.

Immunotherapy uses chemicals, either natural or synthetic to enhance your own immune system to fight or control the cancer cells.

Hormonal Therapy is used in some cancers, which respond to deprivation of their hormone support. These are commonly used in breast cancer or prostate cancer.

Radiation Therapy uses high-energy rays to kill cancer cells. This treatment will be explained further in this booklet. The Radiation Oncologist is the doctor who takes overall charge of your radiation treatment.

WHAT IS RADIATION THERAPY?

Radiation therapy (RT) or radiotherapy is the medical use of ionising radiation to treat patients with cancer and certain non-cancerous conditions. It works by damaging the DNA of cells, and affecting their ability to multiply. Although radiation affects all cells, normal cells are better able to resist or repair themselves from its effects, while cancer cells are generally more sensitive to radiation damage. Every patient's treatment is planned individually, and care is taken during radiation planning to avoid exceeding the radiation dose tolerance of nearby organs.

RT is usually given over a number of sessions, known as fractionations. The number of fractionations required can range from 1 to more than 30, and depends on the type of cancer and the reason for treatment. The treatment does not hurt and it will not make a person radioactive.

The side effects that a patient experiences depends on the area of the body that is being treated as well as the radiation dose delivered.

WHY IS RADIATION THERAPY USED?

Radiation therapy can be used to cure or control cancer, and improve a patient's quality of life by reducing symptoms caused by cancer.

Cure – Radiotherapy can be used in different scenarios to help cure patients of cancer, often in combination with other treatment modalities like surgery and chemotherapy. It can be used as the primary means to eradicate the cancer without surgery, or it can be used before or after surgery to reduce the risk of a relapse.

Control – Where it is not possible to cure a cancer, it may be possible to keep the cancer under control for some time. Radiation therapy can control some cancers by making the tumour smaller and delaying their growth and associated symptoms.

Palliation – Radiotherapy can also be used to reduce symptoms from cancer such as pain, and bleeding.

TYPES OF RADIATION THERAPY

Before you can receive radiation treatment, you will need to be seen by a radiation oncologist, who is a doctor specially trained to give this type of treatment. He will assess your condition to see if radiation therapy is indeed required or appropriate.

Radiation therapy can be given in two ways. The most common is called External Beam Radiation Therapy (EBRT), where the radiation is directed from the treatment machine to a particular area of your body. The other form is Internal Radiation Therapy or Brachytherapy where a small radioactive material is placed inside your body or very close to the cancer. Depending on the type of cancer, you may be given just one form of radiation therapy or a combination of both.

External Beam Radiation Therapy

In External beam radiation therapy (EBRT), the treatment unit or machine directs the radiation energy to the cancer. A number of different treatment units are available in the department. The one that is most suitable for your treatment will be chosen.

Intensity Modulated Radiation Therapy (IMRT)

This is a form of 3-dimensional conformal radiotherapy that focuses multiple radiation beams onto the tumour. The beam intensities can be varied, so that the highest possible dose can be used to destroy cancerous tissue sparing of normal structures. Sophisticated planning is required to determine the most accurate treatment plan.



Image-Guided Radiation Therapy (IGRT)

Image-guided radiation therapy (IGRT) is a process of using various imaging technologies to locate a tumour target prior to a radiation therapy treatment. This process is aimed to improve the treatment accuracy by reducing the need for large target margins which have traditionally been used to compensate for errors in localization. As a result, the amount of healthy tissue exposed to radiation can be reduced, minimizing the incidence of side effects. IGRT is complementary to IMRT. IMRT is used to improve the radiation delivery precision and IGRT is used to improve the radiation delivery accuracy.

Volumetric Modulated Arc Therapy (VMAT)

Volumetric Modulated Arc Therapy refers to the delivery of IMRT in a volumetric arc fashion. Treatment is delivered as the machine rotates 360 degrees around the patient through one or more arcs while continuously keeping the radiation beam on. The shape of the beam varies as the machine rotates to achieve a complex high dose volume in 3D which encompasses the tumour. It is one more weapon in our arsenal where the main advantage of delivering IMRT in a very short time is greatly beneficial in reducing patient discomfort and the effects of motion.

Stereotactic Radiosurgery and Radiotherapy System

This system of delivering radiation therapy combines the advantages of radiosurgery and IMRT in addition to having an image tracking (guidance) system to further enhance treatment accuracy. This involves an integrated treatment system that shapes focused high-energy radiation beams from a multitude of angles to deliver non-invasive, precise treatments that shrink or control the growth of tumour cells of the brain as well as in the head, neck, spine, liver, lung and prostate. This system significantly reduces potential harm to surrounding normal tissue.



Stereotactic Body Radiotherapy (SBRT)

This is the equivalent of radiosurgery in the brain for other parts of the body. It is the delivery of highly focused beams of x-rays to a well-imaged tumour of limited size. SBRT can deliver very high doses of radiation over a relatively short total treatment time (hypofraction) resulting in an increased probability of local tumour control. It is especially useful when patients cannot tolerate surgery or the anaesthesia required for surgery. This advanced technology can be applied for the curative treatment of small lung cancers and control of liver tumours and selected spinal metastases.

3-dimensional (3D) Internal Radiation Therapy or Brachytherapy

Internal Radiation Therapy or Brachytherapy is another form of radiation therapy where a small radioactive material is placed in the body or very close to where the cancer is. This is most commonly used in treating cancers in the cervix, uterus, vagina, head and neck regions and also in the oesophagus, lung, breast and prostate. This treatment can be given alone or in combination with external beam radiation therapy.

The 3D image-based Brachytherapy planning system has increased the accuracy of Brachytherapy, thereby making it possible to reduce normal tissue side effects and to increase the dose to the target volume. During the Brachytherapy procedure, multiplanar CT and MRI images are acquired. This is to help the treating doctor view the tumour size which is required to match the treatment applicators accurately. This in turn would ensure adequate dose of radiation is delivered to the targeted area sparing the normal tissues.



Accelerated Partial Breast Irradiation (APBI)

Accelerated partial breast irradiation (APBI) is a breast conserving therapy approach for early stage breast cancer. The technique aims to kill remaining cancer cells after a breast-conserving surgery. Radiation is delivered to the tumour site with acceptable margins, instead of the whole breast. Normal organs around the tumour site such as skin, lungs, ribs and heart are spared of irradiation. A higher dose of radiation to the tumour site is now possible and the treatment duration is shortened from the usual six weeks regime needed to irradiate the whole breast. Suitable patients are selected based on the stage and aggressive nature of the tumour and node negative tumour.

APBI can be delivered via different methods - multicatheter interstitial brachytherapy, intraoperative radiation therapy and conformal external beam brachytherapy.

Multicatheter Interstitial Brachytherapy

Multicatheter Interstitial Brachytherapy comprises of the precise placement of multiple plastic channels into the cavity where the tumour has been removed. The placement is carried out prior to treatment, followed by a treatment simulation. During treatment, the catheters will be connected to a high-dose-rate afterloader. The afterloader houses the radioactive material, Iridium 192, which is guided into the catheters and will stay for a calculated time in each allocated position. Radiation treatment is delivered twice daily over a period of one week and the catheters will be removed upon completion of treatment.

Intraoperative Radiation Therapy (IORT)

Intraoperative Radiation Therapy (IORT) involves the use of the Intrabeam® device to irradiate the tumour site during surgery. An applicator of suitable size that fits against the walls of the excision cavity is carefully selected for each patient. The entire course of radiation is delivered to the patient in one single dose. The patient is under anaesthesia while the dose is administered thus sparing her of any inconvenience and discomfort that she may sometimes experience if radiation therapy was administered conventionally.



HOW LONG IS A COURSE OF TREATMENT?

Treatment for different patients varies from one day to a few weeks. Commonly, the external radiation treatment will be given once a day for 5 days from Monday to Friday. You will rest on Saturday and Sunday. This is usually done over a period of between 1 to 7 weeks. You may be required to receive treatment from one or more treatment machines during the course of your therapy.

Each dose will cause a little more damage to the cancer cells. Therefore, it is important that you go for all your treatments, as you will need the total dose of radiation to eventually kill the cancer cells.

CHOOSING THE BEST TREATMENT

Your treatment will depend on the type of cancer you have, where it is located and how large it is. It also takes into account your general health and any previous cancer treatments you have had. Your radiation oncologist will explain to you the form of radiation therapy you need to treat your cancer. Some people may only need one form of radiation therapy. Others, may need both. The radiation oncologist will recommend the best treatment for you. Your treatment will be planned in detail, to ensure that enough radiation reaches the cancer, but does as little damage as possible to the surrounding tissues.

The staff at the Department of Radiation Oncology

You will meet a number of different people from the department when you come for your radiation treatment.

The Radiation Oncologist is the doctor who takes overall charge of your treatment.

The Radiation Therapist does the pre-treatment preparation and scans and administers your treatment through radiation machines.

The Nursing Staff is also present to attend to your needs like dressing of wounds, giving medication or injections. They also help in coordinating your treatment.

The Physicist ensures the treatment machines are working properly and accurately.

The Dosimetrist works closely with the radiation oncologist to calculate and plan your treatment.

HOW DO I PREPARE FOR TREATMENT?

Before the treatment:

At the first consultation, you will meet with the radiation oncologist to discuss the best treatment for you. Once the treatment has been determined, a series of appointments for necessary procedures to prepare you for radiation therapy will be made. As almost all radiation therapy treatment is given in supine position, it is important to inform your radiation oncologist if you have difficulty lying down for 30 to 45 minutes. Depending on the medical condition, the patient may need one or more of the following procedures:

- Making of an immobilization device
- Making of treatment accessories (if necessary)
- Localization and marking of treatment area (Conventional or CT-Simulation)
Treatment planning
- Verification of Treatment Plan

Making an immobilization device

1. A Mask or Shell

The purpose of the mask or shell is to enable the affected area to be held in the same precise position during treatment. Not all patients are required to have a mask or shell. It depends upon the particular type of treatment prescribed by the doctor. This will ensure a fast yet very accurate set-up for your daily treatment.



The mask or shell, which is made from a special plastic material, is designed mainly for patients who need to undergo treatment on the head and neck region or over the arms or legs.

The mask or shell is custom made for you in the mould room by a trained technician or radiation therapist. The process takes about 15 minutes. The plastic material is first warmed up to soften it for moulding. Once softened, it is then placed snugly over the relevant area of the patient. The technician will mould the material over the surface and allow the plastic to cool to room temperature. The plastic sheet will gradually harden to fit the impression of the body surface. This shell is then removed and labeled with the patient's identification. The mask or shell will be used during simulation and /or treatment.

2. Making of Body Vac-Lok

Body Vac-Lok is a body mould that is filled with tiny polystyrene beads. The body mould creates a rigid, comfortable cradle around you when a vacuum is drawn through a self-sealing quick-release valve. Body Vac-Lok is designed mainly for patients who need to undergo treatment over the thorax, abdomen, pelvis and the limbs.



The indication for the use of body Vac-Lok is initiated by your radiation oncologist depending on the area of interest and the technique involved.

The body Vac-Lok will be custom made for you in the mould room or the Simulation Room by a group of trained radiation therapists. It is customized to the shape and the position that you need to be in to prepare for your daily radiation treatment. The process will take about 30-45 minutes depending on the complexity of your treatment setup.

The radiation therapist will pre-mould the body Vac-Lok to ensure an equal distribution of the polystyrene beads before you lay down. Once you have been placed in the optimal position for your treatment on the body Vac-Lok, vacuum is drawn through a self-sealing quick releasing valve so that the body Vac-Lok will conform closely to your body contour. Comfort and stability are important factors in patient positioning during a radiotherapy treatment session.

Making of treatment accessories (if necessary)

Making of a mouth piece

A mouthpiece is a small contoured piece of plastic that is placed in the mouth during simulation and radiation treatment of the head and neck region. The purpose of the mouthpiece is to depress the tongue onto the floor of the mouth to help minimise movement of the tongue and jaw during the radiation procedure. When the mouthpiece is placed in the mouth, you will be asked to clench on it firmly.

Care of the Mouthpiece

- Wash the mouthpiece with water and wipe it dry. Do not use hot water as it may melt the material.
- Dry the mouthpiece thoroughly and store in a cool, dry place. The mouthpiece comes with a container for you to keep it clean and hygienic for use.
- Do not leave the container in direct sunlight or heat as it may melt the wax.

Localization and marking of treatment area

Tattoos

Tattoos are tiny ink dots made on the skin to mark out the radiation treatment area permanently. The tattoos are made by injecting little drops of Indian ink underneath the skin. A trained radiation therapist will be able to distinguish them from other skin pigments. These tattoos are important in helping the radiation therapists identify the treatment area quickly and accurately. If you have sensitive skin or any concerns about the tattooing, please inform the radiation therapist.

Simulation

Simulation is an x-ray examination that is meant to simulate the area of treatment defined by the radiation oncologist before the actual radiation treatment begins. This process may or may not be required as it depends on the individual treatment technique used. Usually this is done a few days before the actual day of treatment. The patient may need one or a combination of the following simulation procedures.

1. Conventional Simulation

Conventional simulation is an x-ray examination that allows the radiation oncologist to view and localize the region of interest in a two dimensional plane. The process may take up to an hour depending on the complexity of the treatment area being simulated.



Conventional Simulator
Conventional Simulator

2. Computerized Tomography (CT) Simulation

CT Simulation is another kind of x-ray procedure that is similar to the diagnostic CT scan that the patient may have gone through. The images captured in the CT simulation will be used for detailed three-dimensional computer planning that is necessary for certain types of cancer treatment. Sometimes a contrast is injected into the patient to enhance the CT images for planning purposes.

3. Verification of Plan (VP) Simulation

VP Simulation procedure is another x-ray procedure that simulates and verifies the radiation treatment area. The radiation therapist will explain the procedure to you.



Computerized Tomography (CT) Simulator
Computerized Tomography (CT) Simulator

SIDE EFFECTS OF RADIATION THERAPY

The side effects of radiation therapy differ from one patient to another. The types of side effects also depend on the part of the body being treated and also the duration of the treatment. Some patients may have very mild or no side effects at all, while others may experience more severe ones. Your general health can also affect how your body reacts to the treatment.

The following information acts as a guide to the general effects of radiation. The most common are fatigue, skin changes and/or loss of appetite. These can result from radiation to any part of the body. Other effects are specific to the area being treated. Inform your radiation oncologist or the radiation therapist about the side effects that you experience during your weekly review. Most of these can be prevented, controlled or treated with medication.

Radiation to the head and neck areas

Hair loss

Radiation therapy can cause hair loss to the area that is treated. If the entire head is within the treatment area then you will experience hair loss. This effect may be temporary or permanent, depending on the radiation dosage.

Helpful tips:

- Avoid exposing your scalp to sunlight, while you are on treatment. Use an umbrella, a hat or scarf to protect your scalp.
- Use a mild or baby shampoo for hair washing to prevent irritation and dryness of the scalp.

Skin and ears

The skin on the scalp and ear canal may become red. This effect is temporary and will subside soon after the treatment is completed. You can ask your doctor for creams to soothe the soreness. Do not self-medicate by applying medicated lotion on the treatment area.

- Use an electric shaver to prevent accidental cuts on your face and neck, if you need to shave.

Mouth and throat problems

Soreness of the mouth and/or throat generally appears two weeks after the start of treatment. You will notice that your mouth has less saliva than usual. You may also find it difficult to swallow food and that food tastes different. Do not let these stop you from eating. These side effects may persist even after treatment is over. Ask your radiation oncologist or the radiation therapist for advice to help you to better manage these effects.

Dental problems

If the oral cavity is within the treatment area, you are more likely to experience tooth decay. See a dentist before you start your treatment so that any underlying dental problems can be treated. Discuss with your dentist and radiation oncologist on oral care, prevention of tooth decay and managing problems such as mouth ulcers. It is important that you follow their advice.

Helpful tips:

- Drink plenty of water throughout the day or suck on ice chips to keep your mouth moist.
- Avoid tobacco and alcoholic drinks because they will dry and irritate the mouth further.
- Drink more fluids, soups or fruit juices.
- Avoid the use of commercial mouthwashes as they may contain alcohol that will dry your mouth. Use the mouthwash prescribed by your doctor or gargle with salt water after meals to keep your oral cavity clean.
- Apply oral anesthetics as prescribed by your doctor if your mouth is sore. Avoid eating food that is steaming hot or spicy as they can further irritate the mucus lining of your mouth.
- Avoid drinks and food that is piping hot or icy cold to prevent sensitivity to the teeth and gums.
- Avoid chewing on dry, hard and coarse foods such as nuts, crackers, crisps, and hard candy. These may cause friction and abrasion to the sensitive mouth lining.
- Brush your teeth with a soft bristled toothbrush to prevent injury to the gums.

Radiation to the chest area

Difficulty in swallowing

If your throat is within the treatment area, it may become sore. To minimize the problem:

- Avoid smoking, drinking alcohol and eating hot, spicy food
- Drink plenty of water, between 8 to 10 glasses a day
- Eat softer foods such as porridge or soup based foods
- Eat small frequent meals
- Liquid nutritional supplements may be useful
- Your doctor may prescribe you some medication to lessen the discomfort.

Cough

You may cough more and experience some breathlessness during or after treatment. If your cough produces greenish, yellowish, blood stained or foul smelling sputum, please consult your doctor. Some medication may be required to remedy these problems.

Skin changes

The skin on your chest and especially on your back may become darker, just like a suntan effect. This does not require any medication and the discoloration will lighten gradually after treatment.

Radiation to the breast area

Skin changes

The degree and intensity of the skin reaction will be greater in patients receiving a large daily dose of radiation and in patients who have fair skin. The skin on the treatment site can become red, sore and itchy after a few weeks of treatment. This reaction will remain until about 2 weeks after treatment. To avoid aggravating the skin, you can try the following measures:

- Avoid tight-fitting bras and clothes to prevent friction and irritation to the skin. Choose clothing made from soft material such as cotton.
- Do not apply deodorants, perfumes, talcum powder or medicated lotions on the treatment area. Consult your doctor if you need skin soothing ointment. Wash the area with lukewarm water and gently pat dry. Avoid vigorous rubbing. If you need to shave your underarm, use an electric shaver to prevent accidental cuts.

Shoulder joint stiffness

You may experience some stiffness in your shoulder following breast surgery and/or radiation where the upper arm may be involved. Do daily gentle exercises, such as lifting your arm above your head. This will prevent permanent stiffness to the shoulder joint. For more information on arm exercises, contact your Breast Care Nurse or call the Cancer Helpline at 6225 5655.

Radiation to the abdominal area

Loss of appetite

Radiation to the abdomen can cause you to have loss of appetite, sometimes even nausea and vomiting. If it is severe, inform your doctor or radiation therapist. Medication can be given to relieve this problem. You may feel tired and sleep more often than usual. These effects are temporary and should subside after your treatment ends.

Bowel changes

You may experience some discomfort or cramps during the treatment. This is caused by irritation to the digestive tract lining from the radiation treatment. The discomfort is usually mild and temporary. However, if it becomes severe or occurs frequently accompanied by vomiting or fever, please inform your doctor or radiation therapist at once.

Skin changes

The skin over the treatment area particularly over the back of the body may turn slightly red or become darker, just like a suntan effect. This is temporary and will subside after the entire treatment is completed. Do not self-medicate. Ask your doctor for some topical cream to soothe the irritation.

Skincare:

Do's

- Do wear clothing of soft material. Some of the dye markings may rub off on your clothes; it is best to wear loose soft garments.
- Do protect the treatment area from the sun. Always cover your treated skin by wearing light, close-weaved clothing before going outdoors. Ask your doctor about using a sunscreen (SPF 15+ Broad Spectrum).
- Do inform your doctor at once about any skin changes such as cracks, blisters, skin peeling, rashes and signs of skin infection.

Dont's

- Don't rub, scrub or scratch treated skin or any sensitive spots.
- Do not scrub off the treatment markings on your skin after your treatment. Let them wear off gradually.
- Don't use any soap, creams, deodorants, medicines, perfumes, cosmetics, talcum powder or other substances on the treatment area without doctor's approval. Many over-the-counter skin products, such as lotions and petroleum jelly, leave a coating that can interfere with radiation therapy.
- Don't put very hot or cold items such as a hot-water bottle or ice pack on the treatment area. Bathing or showering with hot water can also injure your sensitive skin. Use only lukewarm water.
- Don't use a razor on the treatment area. If you must shave, use an electric shaver. (Check with your doctor or nurse.)

Radiation to the pelvic area

Bladder irritation

Radiation treatment to the bladder can cause some discomfort and irritation when passing urine. You may also feel the urge to go more often than usual. Increase your intake of fluids as this will help to relieve this uncomfortable symptom. If this discomfort persists or worsens, such as having blood stains in the urine, or if you develop a fever, please inform your doctor or radiation therapist at once.

Bowel changes

Diarrhoea may occur a few weeks after starting treatment. Reduce the intake of vegetables, fruits, milk and milk products to avoid aggravating the condition. If the diarrhoea worsens, inform your doctor.

Skin changes

Some redness and itch may occur on the skin over the buttocks and pubic area. Sometimes it may become sensitive and painful. Avoid wearing tight fitting pants or underwear. The hair on the pubic area may gradually fall if the area is within the treatment field. Request from your doctor some topical cream to soothe the discomfort. Do not apply your own cream or lotion and remember not to erase the treatment markings on the skin.

Reproductive organs

Fertility problems

Having radiation therapy in areas near your reproductive organs can affect your fertility or your ability to have children. This can either be temporary or permanent. In women, radiation therapy to the pelvic area can result in symptoms similar to those of menopause. Radiation therapy affects the ovaries and the production of female hormones. Menstruation may become irregular or stop completely. Sometimes this alteration reverses itself but some women may experience early menopause when the ovaries stop hormone production permanently.

For men, radiation to the pelvic area may affect the testicles, which may reduce sperm production either temporarily or permanently. However, this does not affect your ability to enjoy sex. Speak to your doctor about your concerns before you start your treatment.

Intimacy and sexual concerns

You may experience discomfort during sexual intercourse if the pelvic area is within the treatment field. This discomfort is temporary. You may also experience a lower desire to have intercourse because of this discomfort.

In women, the vagina may feel dry, sore and itchy. This can make intercourse painful. A woman's vagina may feel tender during radiation therapy, and for a few weeks afterwards. As the irritation heals, scarring occurs making the vagina narrower and sexual intercourse painful. You may notice some light bleeding after intercourse because radiation therapy can also make the lining thin and fragile.

After the course of radiation therapy, your doctor will refer you to our Dilation Clinic for patient education and demonstration on the use of dilators. Regular dilation processes will reduce the narrowing of your vagina.

Even if a woman is not interested in staying sexually active, keeping her vagina normal in size allow comfortable gynaecologic examination, an important part of follow-up treatment.

Most men find radiation therapy to their pelvic area has little direct effect on their sexual function. This therapy may occasionally affect sexual function when used for cancers of the prostate, rectum and bladder. It affects erection by damaging the arteries that carry blood to the penis. The higher the total dose and the wider the section of the pelvis is irradiated, the greater the chance that an erection problem will develop.

This change usually develops gradually over a year or two following radiotherapy. Some men continue to have full erections but lose them before reaching climax, while others no longer get firm erections. Some feel a sharp pain when they ejaculate, caused by radiation irritating the urethra, the passageway for semen during ejaculation.

In a small group of men, reduction of testosterone production after pelvic radiation results in lowered sex drive.

FOLLOW-UP CARE

Weekly reviews and follow-up

During the course of radiation treatment, your doctor will review you at least once a week. Your radiation therapist will inform you of your date for review. Once you have completed your course of treatment, you will be required to come for follow-up at the Specialist Oncology Clinic.

Regardless of the type of cancer or treatment you have, you will need regular follow-ups with your doctor. Follow-up will continue for a few years. This is an important part to your recovery. These check-ups may include x-rays, blood tests and other physical examinations to look for signs that may indicate that the cancer may have returned. You may feel quite anxious at these times. This can make it difficult to put the experience of cancer behind you. So, finding a way to support yourself is part of coping and living with cancer. If you have any concerns or suspicions about your health between check-ups, do not wait for the next appointment. Make an earlier appointment to see your doctor.

It is important that you continue to take good care of yourself. Eat a well-balanced diet and drink plenty of fluids to keep hydrated. Exercise regularly to keep fit and active. Inform your doctor before you start any exercise programme. You can also return to work between treatments if you feel well and comfortable. You may wish to discuss this possibility with your doctor.

SUPPORTIVE CARE

Many people feel quite overwhelmed when they learn that they have cancer. Depression, anxiety and anger are common but different people will react differently. There is no right or wrong way to feel.

Your family and friends may need as much support and guidance in coping with their feelings as you do. Talking with your family and friends can help, but sometimes it is easier to share your concerns with someone else such as the hospital social worker or a professional counsellor. You do not need to struggle with your illness alone.

It is often tempting to compare yourself with others who have the same illness, or who are having the same treatment. While this can be helpful, you need to remember that no two people are exactly the same. Recovery and follow-up care are different for each person and depend on the treatment you have received. Another person's response to treatment may be quite different from your own.

You may need to adapt to the physical changes in your appearance, your speech or your diet. You may also go through an emotional roller coaster ride. Coping or overcoming cancer is easier for both the patient and family when there is helpful information and support services available.

Patient Support Programmes

NCCS Patient Support Programmes strive to provide a holistic approach to support you and your loved ones in cancer management. The Patient Support Programmes are designed to help you and your loved ones to:

- Discuss issues, concerns, and difficult decisions in a safe and supportive environment
- Make informed and effective decisions on concerns pertaining to, and coping with your illness
- Build resilience and resources to maintain a meaningful lifestyle
- Promote communication and bonding

Patient Support Programmes include:

- Psycho-educational Talks & Trainings
- Therapeutic Groupwork & Group Therapies
- Interest Groups
- Enrichment Programmes
- Social & Recreational Gatherings

NCCS Patient Support Programmes are open to all cancer patients, survivors and caregivers in Singapore. For more information & registration, please contact Patient Support Programmes at:

(65) 6588 0520 or Cancer Helpline at (65) 6225 5655 or via email
patientsupport@nccs.com.sg

Oncology Support Group

This is a self-help group for cancer patients undergoing chemotherapy, radiation therapy or surgery. Family members and caregivers are welcome to attend.

It is conducted primarily by cancer patients themselves. Doctors, cancer-trained nurses and cancer survivors facilitate the support group. These interactive sessions offers opportunity for new patients to interact with cancer survivors to share their experiences, voice their thoughts and fears and share coping strategies.

The Oncology Support Group meets at the Singapore Cancer Society. Admission is free and patients are encouraged to bring along one or more family members. The society also runs other support groups such as Reach To Recovery for breast cancer patients, New Voice Club for patients with laryngeal cancer and Ostomy Club for patients with ostomies. For more information, contact Singapore Cancer Society at 1800 727 3333, Mondays - Fridays from 8.30am to 6pm.

Medical Social Services

The Medical Social Service Department at the hospital provides quality patient care to enhance emotional support, financial aid, home care, transportation or rehabilitation. A doctor's referral letter will be required for you to see the medical social worker.

Cancer Helpline

The Cancer Helpline is a private, confidential and anonymous one-to-one information and counselling service manned by nurse counsellors. Their aim is to help you through your cancer experience. They provide information, emotional and psychological support, counselling, and linkage to health, welfare and cancer support services available in Singapore.

The nurse counsellors do not give medical advice and treatment recommendations, but may be able to assist you in clarifying your doubts and help in putting into perspective the information you may have received from your doctors. They may be contacted via telephone at 6225 5655 or via email at cancerhelpline@nccs.com.sg

FREQUENTLY ASKED QUESTIONS

Q. How should I care for myself during radiation therapy?

A. Get plenty of rest. Many patients experience fatigue, so it is important you are well rested. Eat a balanced, nutritious diet. Do not attempt to lose weight as you need more calories due to your cancer and treatment. Treat the skin that is exposed to radiation treatment with extra care. Follow the advice from your doctor, radiation therapist and nurse. As there are also many demands that you must cope with, seek out emotional support. At times, it may be helpful to talk about your feelings with a close friend or relative, a counsellor or a member of your healthcare team. Joining a support group and interacting with others who have gone through the cancer experience can also help you to cope better.

Q. What are the long-term effects after radiation therapy?

A. Long-term side effects are not common. However, in some situations, there may be a possibility of some long-term effects with radiation therapy. Speak with your doctor about your concerns, as each person's reaction to treatment is different.

Q. Will I be radioactive after treatment?

A. You will not become radioactive after treatment. Once the external beam therapy is stopped, there will not be any more radiation in your body. Similarly, during internal radiation therapy, you will be treated in a special room. Once the radioactive material is removed, there is no radiation in your body. It is very safe for you to be with your family and friends and even with children. You can continue to have meals and enjoy other activities with them.

Q. Can I continue to take other medication while I am on radiation therapy?

A. If you are on regular medication such as steroids, anti-hypertensives, anti-convulsions for fits or other medications, please inform your treating doctor. He or she will advise you whether to continue, reduce the dose or to stop the medication. Always ask your radiation therapist or your doctor if you are not sure. It is important not to start on any home remedies or use any medication without your doctor's approval.

TREATMENT AND SUPPORT UNITS AT NCCS

Department of Radiation Oncology

National Cancer Centre Singapore
Basement 2
Enquiry line : 6436 8600
Registration Counter : 6436 8181

Singapore General Hospital
Blk 2 Basement 1
Enquiry line : 6436 8600
Registration Counter : 6321 4211

Useful Contact Details

- Appointment Scheduling Unit : 6436 8088
- General Enquiries : 6436 8000
- Dept of Psychosocial Oncology : 6436 8126
- Patient Support Programmes : 6588 0520
- Outpatient Pharmacy Helpdesk : 6436 8091
- Cancer Helpline : 6225 5655

INTERNET RESOURCES

American Cancer Society (ACS)
www.cancer.org

Cancer Council, Australia
www.cancer.org.au

Penn Medicine Abramson Cancer Centre
www.pennmedicine.org/cancer

National Cancer Institute
www.cancer.gov

Macmillan Cancer Support
www.macmillan.org.uk

National Cancer Centre Singapore (NCCS)
www.nccs.com.sg

For more information on cancer, please call the

**Cancer Helpline at Tel: 6225 5655
or email cancerhelpline@nccs.com.sg**

MONDAYS - FRIDAYS : 8.30am to 5.30pm

SATURDAYS, SUNDAYS & PUBLIC HOLIDAYS : CLOSED (Please leave a message. We will get back to you on the next working day. For urgent matters, please seek urgent medical attention.)

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THIS IS A PATIENT EDUCATION INITIATIVE BY:

Cancer Education & Information Services

Division of Supportive and Palliative Care

National Cancer Centre Singapore

11 Hospital Crescent

Singapore 169610

Tel: 6225 5655 Fax: 6324 5664

Website: www.nccs.com.sg

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