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Your guide to radiation therapy

HYGEIA Hospital Radiation Oncology Centre

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About this guide

This guide is written for patients who are about to get or is now getting radiation therapy for cancer and covers:

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- Information about the radiation therapy team
- Questions and answers about possible side effects due to radiotherapy and ways to manage them
- Useful advices during radiotherapy
- Questions to ask your radiation oncologist

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Questions and answers about radiotherapy

What is radiotherapy?	**Radiotherapy** (also called **Radiation therapy**) is a cancer treatment that uses high doses of radiation to kill cancer cells and stop them from spreading.
How is radiatherapy delivered?	Radiation therapy can be **external** (when a machine outside your body aims radiation at cancer cells) or **internal** (when radiation is put inside your body, in or near the cancer cells) – called **brachytherapy**.
Who gets radiotherapy?	Radiotherapy is used safely and efficiently for cancer treatment for more than 100 years. Nearly 2/3 of people with cancer get radiation therapy.
What does radiotherapy do to cancer cells?	Given in high doses, radiation kills or slows the growth of cancer cells. Radiation therapy is used to: • **Treat cancer:** Radiation can be used to cure, stop, or slow the growth of cancer. • **Reduce symptoms:** When a cure is not possible, radiation may be used to shrink cancer tumors in order to reduce symptoms. Radiation therapy used in this way can treat problems such as pain, hemorrhage etc.
How long does radiotherapy take to work?	Radiation therapy does not kill cancer cells right away. It takes days or weeks of treatment before cancer cells start to die. Then, cancer cells keep dying for weeks or months after radiation therapy ends.
What does radiation therapy do to healthy tissues?	Radiation not only kills or slows the growth of cancer cells, it can also affect nearby healthy cells. The healthy cells almost always recover after treatment is over. **New techniques**, such as **IMRT/VMAT/IGRT**, allow your doctor to aim higher doses of radiation at your cancer while reducing the radiation to nearby healthy tissues.
Does radiotherapy hurt?	No, radiation therapy does not hurt while it is being given. But the side effects that people may get from radiation therapy can cause pain or discomfort. Your Radiation Oncologist can help you manage the side effects you might have.

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What happens when my radiotherapy is over?

Once you have finished your radiation therapy, you will need **follow-up care** for the rest of your life. Follow-up care refers to checkups with your medical oncologist or/and radiation oncologist.

Please inform us about your follow up checks results.

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External Beam Radiotherapy – New techniques

What is external beam radiotherapy?

External beam radiation therapy is delivered by a linear accelarator (LINAC) that produces high energy photon beams or electron beams. External beam radiation therapy is a local treatment. The radiation is aimed exactly at the area (target) that your Radiation Onologist has defined.

Linear accelerator Elekta VERSA HD

Which are the new techniques in radiotherapy and what are their advantages?

New radiation therapy techniques have the advantage of delivering radiation with high presicion while minimizing the dose to surrounding healthy tissues and therefore minimizing side effects.

3D Conformal Radiotherapy:

3D Conformal Radiotherapy conforms radiation to the area that the Radiation Oncologist had determined (target) while keeping the dose to the surrounding tissues as low as reasonably achievable. It uses multiple beams of uniform intensity that conform to the target.

Intensity Modulated Radiation Therapy (IMRT):

Intensity Modulated Radiation Therapy is an advanced type of 3D conformal radiotherapy that uses multiple beams that conform to the target of non-uniform intensity. This allows high conformance of dose around the target while the dose to organs at risk is lower and the side effects are less. This technique allows higher doses to be delivered to the target and improves disease local control.

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Volumetric Modulated Arc Therapy (VMAT):

Volumetric Modulated Arc Therapy (VMAT) is a state of the art radiation therapy. It's a novel form of IMRT that allows dose to be delivered in a single 360 degrees rotation. It is a high precision technique that highly conforms dose around the target. It allows higher dose of radiation to be delivered improving in that way the disease local control. The sourounding healthy tissues are spared and the possibility of side effects is minimized.

Image Guided Radiation Therapy (IGRT):

Image Guided Radiation Therapy refers to the use of patient imaging in the treatment room, just before radiation starts, to ensure accurate dose delivery to the target. Cone beam CT is the most advanced technique. Patient posiotioning is guided by 3D images obtained by an on board CT imager just before the treatment starts. CT images of the patient are taken on the treatment machine and compared to the CT images used for treatment planning. Sophisticated software calculates the differences and corrects on - line the position of the treatment couch. IGRT ensures highest precision of dose delivery.

Stereotactic Radiotherapy – Stereotactic Radiosurgery (SRT/SRS):

Stereotactic Radiotherapy - Radiosurgery is a specialized technique, that utilizes highly targeted radiation beams under image guidance for the treatment of small lesions anywhere within the patient.
Unlike conventional fractionated radiotherapeutic techniques, stereotactic radiotherapy deliveres very high dose in a single fraction (called stereotactic radiosurgery) or few (1-10) number of fraction (called stereotactic radiotherapy).

Hygeia's Radiation Oncology Center performs a wide range of stereotactic applications to target tumors throughout the body using specialized linear accelerators incorporating highly accurate robotic systems. Hygeia is the first and only one hospital in Greece that uses **unique precision g-knife radiosurgery** for brain lessions.

How often will I get external beam radiotherapy?

Most people get external beam radiation therapy once a day, 5 days a week, Monday through Friday. Treatment lasts for 2 to 10 weeks, depending on the type of cancer you have and the goal of your treatment. The time between your first and last radiation therapy sessions is called a course of treatment. Radiation is sometimes given in smaller doses twice a day (hyperfractionated radiation therapy). Your doctor may prescribe this type of treatment if he or she feels that it will work better.

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Do I need to stay in the hospital during external beam radiotherapy?

Most patients treated with external beam radiotherapy are outpatients. This means that you will have to come to the hospital only for your daily treatment.

What happens before my first external beam radiotherapy

Your will have a consultation with your Radiation Oncologist. Your doctor will physically exam you, talk about your medical history, and maybe ask for imaging tests. Your doctor will discuss external beam radiation therapy, its benefits and side effects, and ways you can care for yourself during and after treatment. You can then choose whether to have external beam radiation therapy and sing the **informed consent.**

If you agree to have external beam radiation therapy the secretary will fill in your demographic data and take a photo of you.

The photo will be used daily as part of your identification process. The secretary will schedule an appointment for **immobilization** procedure:

- The accuracy of your everyday treatment depends on your positioning on the linear accelerator. Every day you have to be positioned in the same way. It is of great importance to «immobilize» you at this position.
- This procedure takes place in the machine called "Simulator". The radiographer will follow your doctor's instructions and position you in the way you will be treated daily. He will then put small permanent marks (tattoos) on your skin to mark the treatment area. You will need these marks throughout the course of radiation therapy. The radiographers will use them each day to make sure you are in the correct position. Tattoos are about the size of a freckle and will remain on your skin for the rest of your life.
- If you are getting radiation to the head & neck region, you will need a mask. The mask has air holes, and holes can be cut for your eyes, nose, and mouth. It attaches to the table where you will lie to receive your treatments. The mask helps keep your head from moving so that you are in the exact same position each day.
- When immobilization is finished, the radiographer will take some pictures of you at treatment position to include them in the instructions of your daily positioning in your file.

Construction of thermoplastic mask for immobilization.

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What is a planning CT scan?

In order to prepare your treatment plan and to accurately calculate the dose to the target and organs at risk, you will have to have a CT scan positioned in the way you were immobilized. This CT is not diagnostic. If a mask is used for your daily immobilization then you will need to have the planning CT scan with the mask on.

Do I need to have other imaging examinations (p.e. MRI, PET etc);

In many cases, in order to accurately define the target, your doctor might ask for more diagnostic imaging examination. These could be examinations that you already had or new ones (p.e. MRI, PET etc.). These images are useful for you treatment plan because they provide more **anatomic and functional information** for the area that will be treated. The medical physicist is using sophisticated software to fuse all these images.

What is a treatment plan?

The Medical Physics department prepares your treatment plan. This means the way that your treatment will be delivered and how much time you will need to stay on the linear accelerator. In addition, the dose to the target and the sourrouning normal tissues is calculated. All treatment plans are verified with measurements on the machine or with indepenendent calculations before you start your treatment, for your safety.

Your treatment plan data are electronically send to the patient information system MOSAIQ and your daily treatment is scheduled.

What happens during my treatment sessions?

- You will be escorted to the linear accelerator room where you will have your daily treatment.
- You will be asked to remove your clothes at the area you will be irradiated.
- The radiographer will help you lie down on the treatment couch.
- The radiographer will position you in the correct way following the treatment plan instructions.
- The radiographer uses your skin tattoos or marks on your mask to position you correctly with the use of lasers that help him for your accurate positioning.
- In some fractions Image Guided Radiation Therapy will be used. This means that your positioning will be checked and corrected with the help of images (planar or CT), taken on the treatment machine, just before your treatment starts.
- You will need to stay very still so the radiation goes to the exact same place each time. You can breathe as you always do and do not have to hold your breath.

The radiographer will leave the room just before treatment begins. He or she will be at the control room and will **watch you** from two cameras that are installed in the treatment room. He or she **can hear and talk with you**

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through a speaker in your treatment room. Make sure to tell your radiographer if you feel sick or uncomfortable. He or she can stop the radiation machine at any time. You cannot feel, hear or see radiation.

The time you will spent in the machine in total is almost 15min. Most of the time is spent setting you in the correct position. You will get radiation only for 1-2min. If you are getting IMRT or VMAT treatment, radiation will last some more minutes.

Will external beam radiotherapy make me radioactive?

No, external beam radiation therapy will not make you radioactive. It is **absolutely safe** to be around other people, even babies and young children.

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Brachytherapy

What is brachytherapy?

Brachyterhapy is a radiotherapy technique that uses radioactive sources placed in body cavities, in tissue or close to the target in order to deliver very high dose to the target while minimizing the dose to the sourrounding tissues.

High Dose Rate (HDR) Brachytherapy uses high activity sources and allows quick irradiation of the tumor volume. In this type of brachytherapy, the radiation source is in place for few minutes at a time and then taken out. The schedule of your treatment depends on your type of cancer.

Brachytherapy is used to treat cervical cancer, breast cancer, esophagus cancer etc. Sometimes brachytherapy is combined with external beam radiotherapy.

Hygeia's Center of Radiation Oncology uses HDR Brachytherapy with iridium (Ir-192) radioactive source.

What happens before my first brachythearapy?

Your will have a consultation with your Radiation Oncologist. Your doctor will physically exam you, talk about your medical history, and maybe ask for imaging tests. Your doctor will discuss brachytherapy, its benefits and side effects, and ways you can care for yourself during and after treatment. You can then choose whether to have brachytherapy and sing the **informed consent**.

If you agree to have brachytherapy the secretary will fill in your demographic data and take a photo of you. The photo will be used as part of your identification process.

How is brachytherapy put in place?

Brachytherapy procedure is performed in the brachytherapy suite or in the simulator room of Hygeia's Radiation Oncology Centre.

Most brachytherapy is put in place through a **catheter**, which is a small, stretchy tube. Sometimes, it is put in place through a larger device called an **applicator**. When you decide to have brachytherapy, your doctor will place the catheter or applicator into the part of your body that will be treated.

If the positioning of the catheters or applicators is painful, you will be put under sedation or anesthesia otherwise you will be asked to stay still until the positioning procedure finishes.

Please inform your doctor or nurse if you feel any pain.

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What happens after the catheter or applicator is placed in my body?

When the positioning of catheters or applicator is finished, the radiographer will take some radiographic images or you will be transferred to CT/MR department in order to image the area of your body where the catheters or applicators are placed. Imaging is needed in order to create your treatment plan.

Once your treatment plan is complete, the radiographer will connect the Brachytherapy machine.

The radiographer will leave the room just before treatment begins. He or she will be at the control room and will **watch you** from two cameras that are installed in the treatment room. He or she can **hear and talk to you** through a speaker in your treatment room. Make sure to tell your radiographer if you feel sick or uncomfortable. He or she can stop the brachytherapy procedure at any time. You cannot feel, hear or see radiation.

Radiation will be placed inside the catheter or applicator. The radiation source may be kept in place for a few minutes.

When brachytherapy finishes the doctor will remove the catheters or applicators placed in your body.

What is a treatment plan?

The Medical Physics department prepares your treatment plan. This means the way that your treatment will be delivered and how much time you will need to stay in the brachytherapy suite. In addition, the dose to the target and the sourrouning normal tissues is calculated.

Your treatment plan data are electronically send to the brachytherapy machine console and your treatment is scheduled.

Will brachytherapy make me radioactive?

No, High Dose Rate Brachytherapy will not make you radioactive. It is **absolutely safe** to be around other people, even babies and young children.

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Who is on my radiation therapy team?

Radiation Oncologist	Radiation Oncologist is a doctor who specializes in using radiation therapy to treat cancer. He or she prescribes how much radiation you will receive, plans how your treatment will be given, closely follows you during your course of treatment, and prescribes care you may need to manage side effects. He or she works closely with the radiation therapy team in order for you to have the best treatment.
Medical Physicist	The Medical Physicist is responsible for the choice of radiation therapy technique and treatment machine that will be used for your radiotherapy in order to have the best treatment. He or she is also the person that creates your treatment plan and is responsible for the verification of the plan prior to your treatment start. In addition, the medical physicist is responsible for checking and correcting your positioning on the treatment machine when IGRT is used.
Radiographer	Radiographer is the person that works with you during each radiation therapy session. He or she positions you for treatment and runs the machines to make sure you get the dose of radiation prescribed by your radiation oncologist. He or she is responsible for the verification of your daily treatment data.
Radiotherapy Nurse	The Radiotherapy nurse will provide you nursing care (if needed) during your course of treatment.
Quality Assurance	**Hygeia Hospital is JCI accredited. The quality and safety of your treatment is guaranteed through a series of procedures that won't allow treatment delivery if special checks are not performed.**

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Radiation therapy possible side effects

What are side effects?

Side effects are problems that can happen as a result of radiation therapy treatment. They may happen because the high doses of radiation used to kill cancer cells can also damage healthy cells in the treatment area. Side effects are different for each person. Some people have many side effects; others have hardly any. Side effects may be more severe if you also receive chemotherapy.

Your radiation oncologist will inform you about the possible side effects you might have. The team will watch you closely and ask if you notice any problems. If you do have side effects or other problems, your doctor will talk with you about ways to manage them.

Common side effects

Most people getting radiotherapy have skin changes and fatigue. Other side effects depend on the part of your body being treated.

Radiation therapy side effects occur only in the part of your body that is irradiated.

Skin changes may include dryness, itching, peeling, or blistering. These changes occur because radiation therapy damages healthy skin cells in the treatment area. You will need to take special care of your skin during radiation therapy. Your doctor will give you instructions how to take care of skin.

Fatigue is often described as feeling worn out or exhausted.

Depending on the part of your body being treated, you may also have:

- Diarrhea
- Hair loss in treatment area
- Mouth problems
- Nausea and vomiting
- Sexual changes
- Swelling
- Trouble swallowing
- Urinary and bladder changes

Most of these side effects go away within 2 months after radiation therapy is finished.

Some side effects may first occur 6 or more months after your radiation therapy is finished. They vary by the part of your body that was treated and the dose of radiation you received. Possible side effects may include infertility, joint problems, lymphedema, mouth problems, etc. Everyone is different, so talk to your doctor about how to manage your side effects.

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Useful advices during radiotherapy

How can I take care of my skin?

Some people develop a skin reaction due to radiotherapy. The area may become more dry or sensitive. The amount of reaction depends on the area being treated and the individual's skin. **Some people have no skin problems at all.**

Below are some instructions on how to treat your skin over the treatment area:

1. Wash with warm water that is not too hot or too cold.
2. We recommend that you use simple soap to wash with.
3. Dry the area with a soft towel; do not rub, pat dry gently.
4. Gently apply a moisturizing cream to the area, 2 to 3 times a day.
5. Do no use talcum powder
6. Refrain form wet shaving, waxing, cream or laser hair removal
7. Refrain from swimming in a chlorinated pool
8. Don't expose your skin to extremes of temperature e.g. hot water bottles or ice packs, sunlight.

These restrictions apply to the treatment area only. If you are unsure about the exact area that is being treated, please ask your doctor to show you. After your treatment finishes, continue your skin care regime until your skin has recovered.

Clothing

During treatment you may prefer to wear loose fitting clothing, preferably in natural fibers that are more comfortable and less irritating to the skin. Collars, straps or underwired bras can cause irritation if they rub against your skin.

Avoiding the sun

Your skin in the treatment area will be very sensitive and needs protecting from the sun. For example, if you are having radiotherapy to your head or neck region, try wearing a hat or cotton scarf. While you are having treatment, it is important not to use any sun protection products over the treated area. The chemicals in these products can irritate your skin.

Fatigue

Fatigue is often described as feeling worn out or exhausted. The ways to manage fatigue are:

- Try to sleep at least 8 hours each night.
- Plan time to rest. You may need to nap during the day. Many people say that it helps to rest for just 10 to 15 minutes.
- Try not to do too much. Choose the activities that are most important to you. For example, you might go to work but not do housework.
- Exercise**.** Talk with your doctor or nurse about how much exercise you can do while having radiation therapy.
- Plan a work schedule that is right for you**.**

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Hair loss	Radiation therapy can cause hair loss. This only happens on the part of your body being treated. Your hair will grow back 3 to 6 months after treatment is over.
Nutricion	It is important to maintain a healthy diet and drink plenty of fluids whilst on treatment. You may find that your eating habits change. It may be easier to have small snacks throughout the day rather than big meals. If you are having problems with eating it is important to ask your doctor.
Smocking & Alcohol	Stopping smoking and drinking alcohol during and after radiotherapy is very worthwhile. Research has shown that smoking may make the radiotherapy treatment less effective, as well as increasing the side effects.
Further effects	These will depend upon the area that you are having treated. Your doctor will discuss these with you during your first appointment.
Ask us	Don't hesitate to ask us if you have any questions.

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Questions to ask your doctor

What king of radiation therapy will I get?

How can radiation therapy help?

How many weeks will my course of radiation therapy last

What kind of side effects should I expect during my course of radiotherapy and how long will they last?

How can I manage these side effects?

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