

Introduction to Radiotherapy Process

A Guide for Patients and Families



Introduction to Radiotherapy Process

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Introduction to Radiotherapy Process

Prior to beginning radiotherapy, treatment simulation is proceeded to accurately deliver radiation on to the tumor tissue in the body. The Simulation is a very important step to prepare for positioning devices; it determines the appropriate posture for the treatment and marks the treatment field.

This booklet explains how the series of treatment is processed in the Department of Radiation Oncology. You will be thoroughly informed about the simulation used in the treatment and also about the actual radiotherapy process. This guide provides photographs in each step to help you understand radiotherapy better.

The simulation and radiotherapy is customized for each individual patient. Therefore, some portions of the booklet may not be applicable for some patients. If you want more information about radiotherapy after reading this booklet, please contact one of our medical professionals for details.

Let's get started on our trip to radiotherapy.

Reception Desk / Payment

- You must check in at the reception when you arrive for an appointment.
- If you are using an automatic reception machine, insert the hospital-issued magnetic card, check your name, and press the “check-in” button. Please check for confirmation promptly and wait in the designated waiting room for treatment.



<Reception Desk>



<Automatic Reception Machine>

- If the automatic reception machine notifies you to contact the reception desk, you have to confirm if with the receptionist for further instructions.



<Receptionist Helping a Patient>

- Payment can be made at the departmental billing desk. Reserved payment is also possible or use the automatic reception machine.

Waiting Room

After the check in, your name will be called as you wait in the waiting room. You may check your waiting status on the electronic display.



<Waiting room in front of the reception desk> <Waiting area in front of the Doctor's exam rooms>

Resting Room

If you need to calm your mind and body or have long hours of waiting time left for your appointment, you may use a resting room. The resting room is for patients who receive radiotherapy. Please do not talk loudly or eat in the room. Be careful not to fall off when using the sofa.



<Inside the resting room>

Counseling Room

After the initial visit to the Department of Radiation Oncology, if radiotherapy is to be delivered, you will be informed about treatment processes and ways to prepare for your treatment in detail.



<Consulting with a nurse>

Education Room

Once a week, (Every Tuesday from 10 to 11AM) an instructor from the treatment room will be running a class on the basics of radiotherapy. If you would like to participate in one of the classes, make a reservation at the Cancer Education Center. (**Reservation & Inquiry** ☎ 02-3410-6619)



<Radiotherapy Class>

Installation Of Contrast Medium Injection Devices

During the simulation, computed tomography (CT) may be used for Image acquisition. In order to obtain more distinct images for the planning, a contrast medium may be injected. In such cases, a nurse will connect the injection device for you.



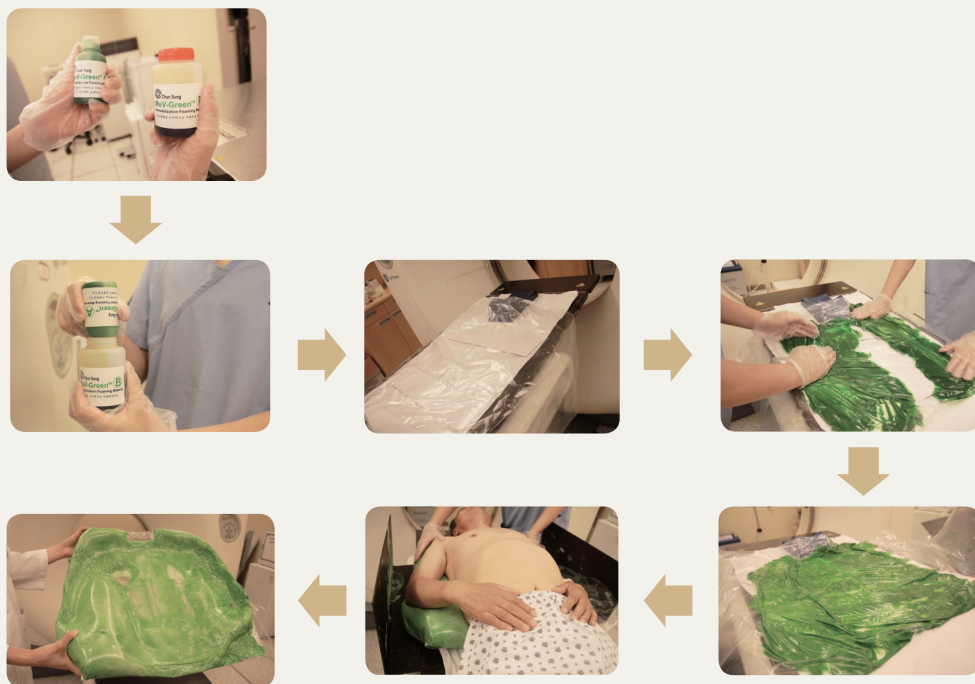
<Contrast Medium Injection>



<Connecting and Injecting Contrast Medium>

Immobilization Device

The body must be fixed during radiotherapy in order for radiation to be delivered accurately. A variety of customized immobilization devices are used during the simulation for individuals who have unstable posture and for patients who have problems lying down for long hours.



<Working on Positioning Device>



<Posture Positioning Devices>

1) Head and Neck Positioning Device (Thermo Plastic Mask)

In a case which radiation therapy needs to be done on your brain, head, or neck area, putting a mark on the face will be inconvenient for patients to carry out their daily life. Therefore, a plastic mask is built in the shape of patient's face. You lie down, place your head and neck on a customized head and neck rest, while a therapist puts a plastic net in warm water to make it easy to mold. Then, the warm plastic mask will be put on your face which gently shapes itself to conform to your facial features. The radiation therapist uses a blow dryer to cool off and dry out the mask. Once the mask has hardened, the radiation therapist puts marking tape on the individual mask to mark the field for treatment.



<Making of Head and Neck Positioning Device (Aqua Plast) >

2) Various Positioning Devices

Several cushions are provided to keep you in a comfortable position on the treatment table during radiotherapy. Customized devices are used for patients who lie face down for the treatment.



<Examples of pillows>

Simulation

Department of Radiation Oncology in Samsung Medical Center is staffed with three simulation devices. The type of device used is determined by the purpose and site of treatments.

1) Simulation using Fluoroscopy

As one of the basic simulation devices, this machine helps determine the area that needs to be treated through real time X-ray video. X-ray is applicable to the spine and metastatic cancer patients who need prompt treatment so a treatment plan can be drawn up quickly.



<Simulation Machine using Fluoroscopy>

2) Simulation using Computed Tomography (CT) Scanner

This device is used when massive amounts of radiation need to be delivered to the tumor tissue while minimizing exposure of normal tissue or when a treatment field is widely spread in multiple sites. This device is mostly used for 3 Dimensional Conformal Therapy or High-Precision Radiation Therapy such as IMRT.



<Simulation Machine using CT Scanner>

3) 4D(Dimensional) Simulation with Respiratory Gating

If the tumor is located on moving organs such as the stomach, liver, lung and etc., this special CT device makes it possible to obtain the images of organs and tumors during each respiratory cycle. Patients who will be on 4D simulation will learn how to breathe properly before simulation.

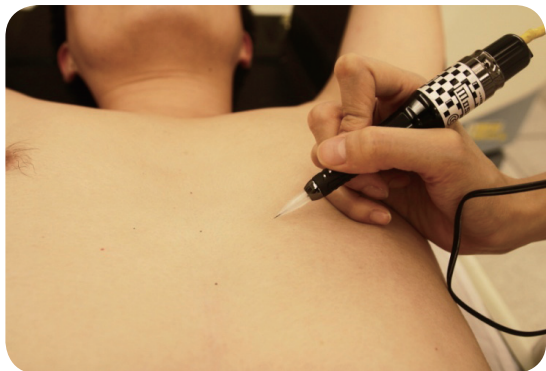
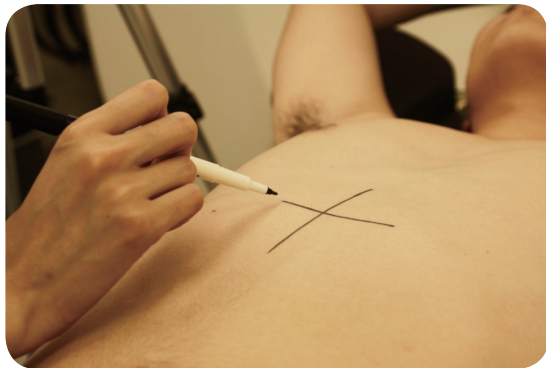


<Simulation exclusively for Respiratory Gated Guided Radiotherapy>

Marking the Treatment Area & Semi-permanent Tattoos

Once the treatment field is determined, the area is marked with a marker ink or etc. Be careful not to wash off the marks because the radiation therapist must confirm the marks. Allow water to run over the marks, but do not rub them or put cream and lotion on them. If the treatment duration is prolonged, semi-permanent tattoos can be placed as a mark.

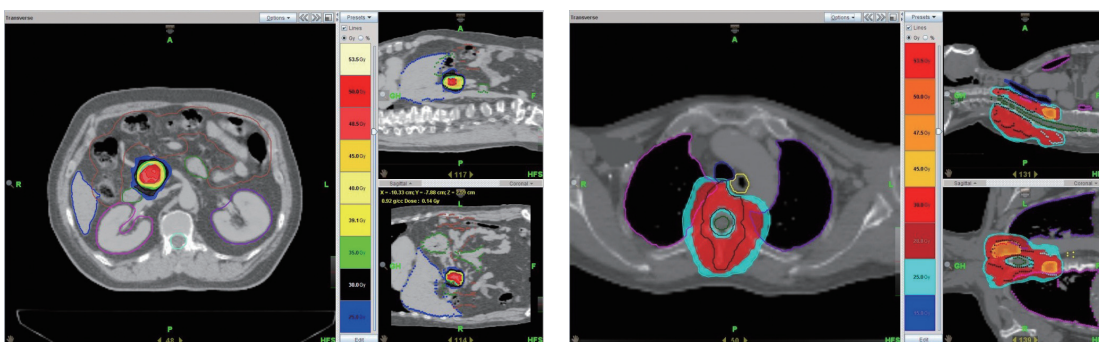
To make a tattoo, the radiation therapist marks your skin with a small drop of ink, then pricks your skin with a tiny needle. You may have very brief discomfort but the tattoo is very tiny and unnoticeable. In most cases, it disappears in a year, but in some cases, it may take longer.



<Marking the treatment area and the process of making a tattoo>

Computerized Planning

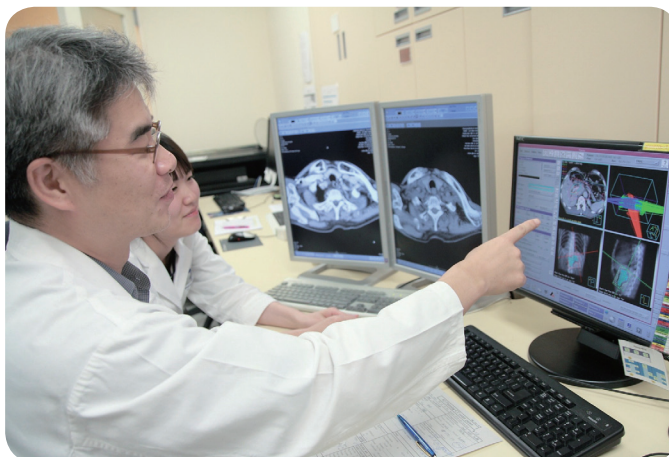
After acquisition of the CT images, all of the processes that are based on the treatment volumes are delineated on each slice by a physician. Once the treatment site is determined, the most appropriate radiotherapy plan is designed and completed using a computer planning system. Simple planning takes from several hours to one day, however more detailed planning takes about one week.



<Completed computerized radiotherapy plan. Radiation focus on the tumor tissue.>

Approval of the Treatment Plan

After the treatment plan is completed, it is approved by physicians and is electronically transferred to the treatment system. After the plan is entered into the automatic system, that process will be controlled automatically under the supervision of physicians and therapists.



Accessing the Treatment Room

No one is allowed in the treatment room except the patient while radiotherapy is in process. The door in the treatment room is designed with thick layers of radiation attenuating metals to prevent radiation leakage. Therefore, please follow the instruction of the radiation therapist for safety during the treatment.



<Opening and closure of the shielding door in the radiotherapy room>

Treatment Equipments

(Linear Accelerator)

Our center has four general linear accelerators, the tomotherapy machine, the 4D (Dimensional) linear accelerator with respiratory gating ability, the Novalis TX[®] radiosurgery system that uses a Shaped Beam Surgery component for precision (radiation surgery). Among these 4 machines, the most appropriate machine is selected by considering the purpose of the treatment, condition, and field of the treatment, the effectiveness against the disease and the cost efficiency.



<General Linear Accelerators>



<4D Linear accelerator for
Respiratory gating>



<Tomotherapy>

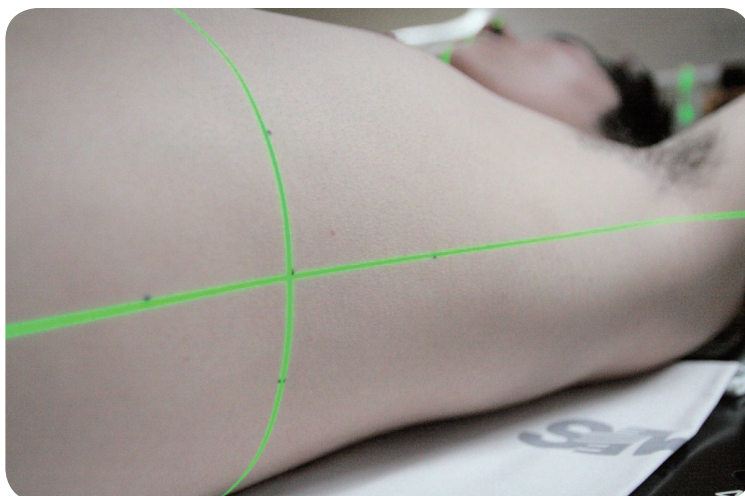


<Novalis TX®>

Lasers in the Treatment Room

You may see a red or green cross beam on your body during the treatment. The laser lines are used for accurate positioning for radiation delivery.

The green and red lasers do not burn your skin or harm you in any way.



<Positioning the treatment area using lasers>

Adjusting the Treatment Table

Once a patient lies down on the treatment table, the therapist moves the treatment table to align the mark on the body with the lasers in the treatment room. To ensure your safety, try not to move while you are on the treatment table nor get up until the therapist tells you it is okay to do so. If you still feel uncomfortable while lying down, the therapist will reposition you securely.

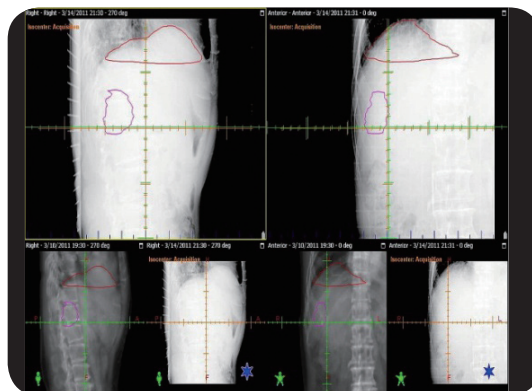


<Positioning the treatment area using lasers>

Control Room

After positioning, radiation therapists proceed to carry out the treatment using computerized plans and movements that are controlled remotely by the computer.

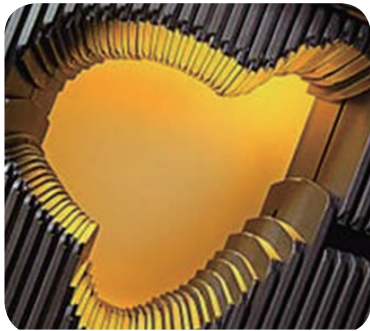
A control room and the treatment room are equipped with microphones and speakers for communication between the two rooms. If you have any questions, please speak out at any time. Also, the treatment room is monitored via CCTV in preparation for a possible emergency.



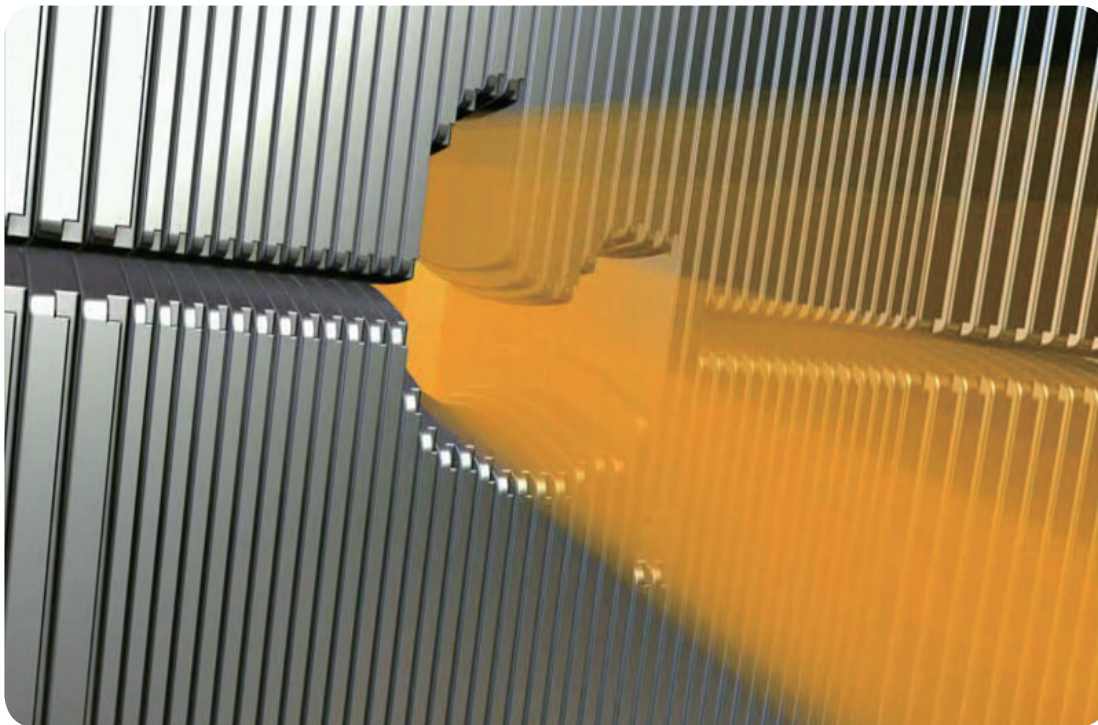
<Final checkup : Checking whether radiation is delivered accurately as planned>

Shielding & MLC(Multi-leaf Collimators)

In order to minimize side effects and maximize the effectiveness of radiotherapy, the radiation must be delivered directly to the tumor tissue with minimal exposure to normal tissues. For this reason, a shielding and multi-leaf collimator is installed. In the past, therapists directly installed it on the machine. Now, however, the computer automatically installs and removes this device except for special circumstances.



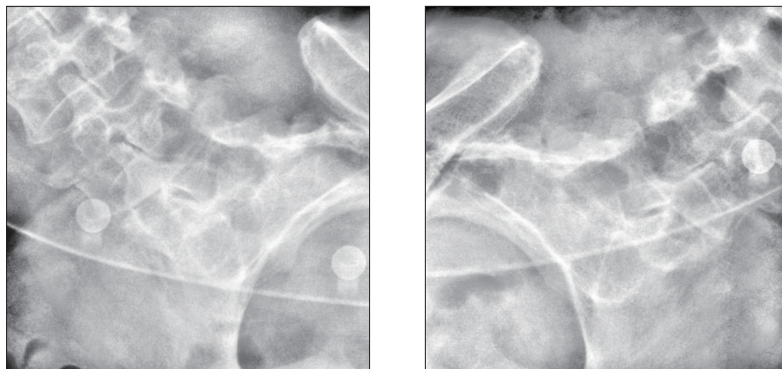
<MLC shaping>



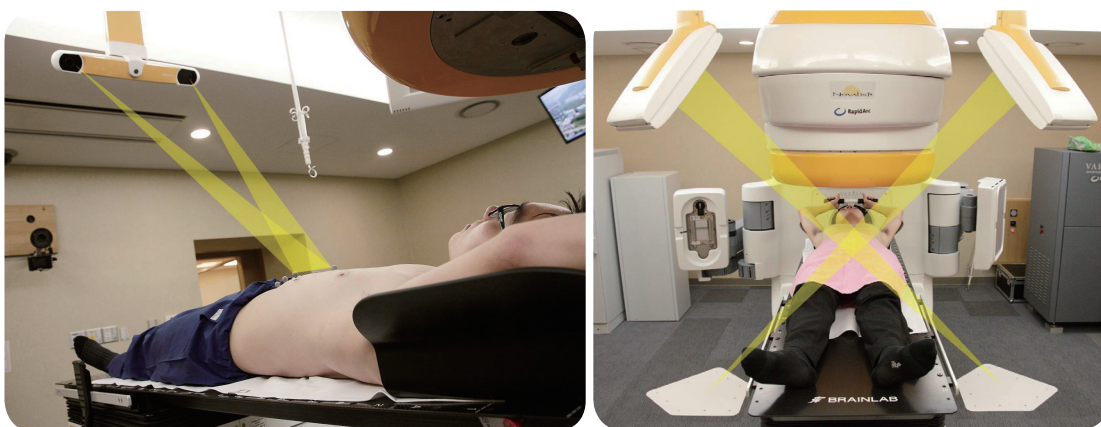
<MLC block radiation from reaching healthy tissues near the tumor area>

Portal Films(Treatment Verification)

Portal films are created to document treatment and to ensure accurate positioning in the final stage of the radiotherapy.



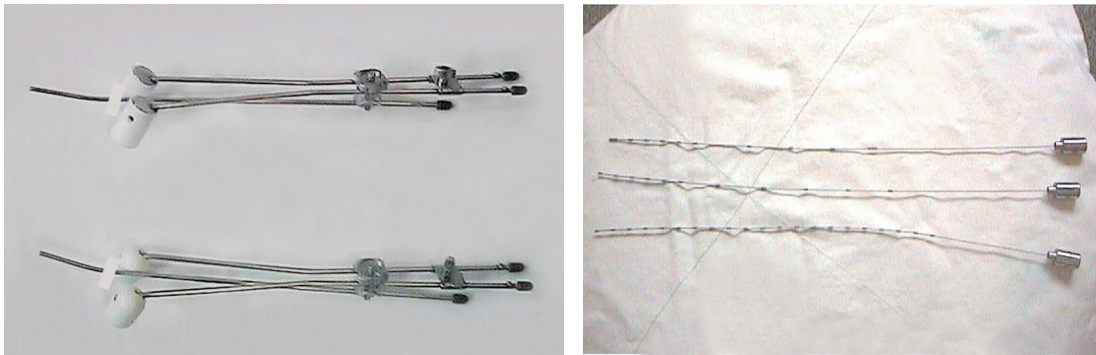
There may be a discrepancy between the marked position and the actual treatment area. An imager used for verification is called a portal film. In some cases, CT images are used for the Verification process. Once the accuracy of the treatment is verified, we proceed to the next stage of the treatment.



<Verifying the treatment area on the Novalis TX®>

Intracavitary Treatment (Intracavitary Irradiation)

Intracavitary treatment is a special treatment method using intracavitary tools which are inserted into the patient's body to deliver massive amounts of radiation. The medical team determines if intracavitary treatment is needed which is common in cases of uterine or esophageal cancer for example. If you have any inquiries, please contact the reception desk for more information.



<Insertion tools>



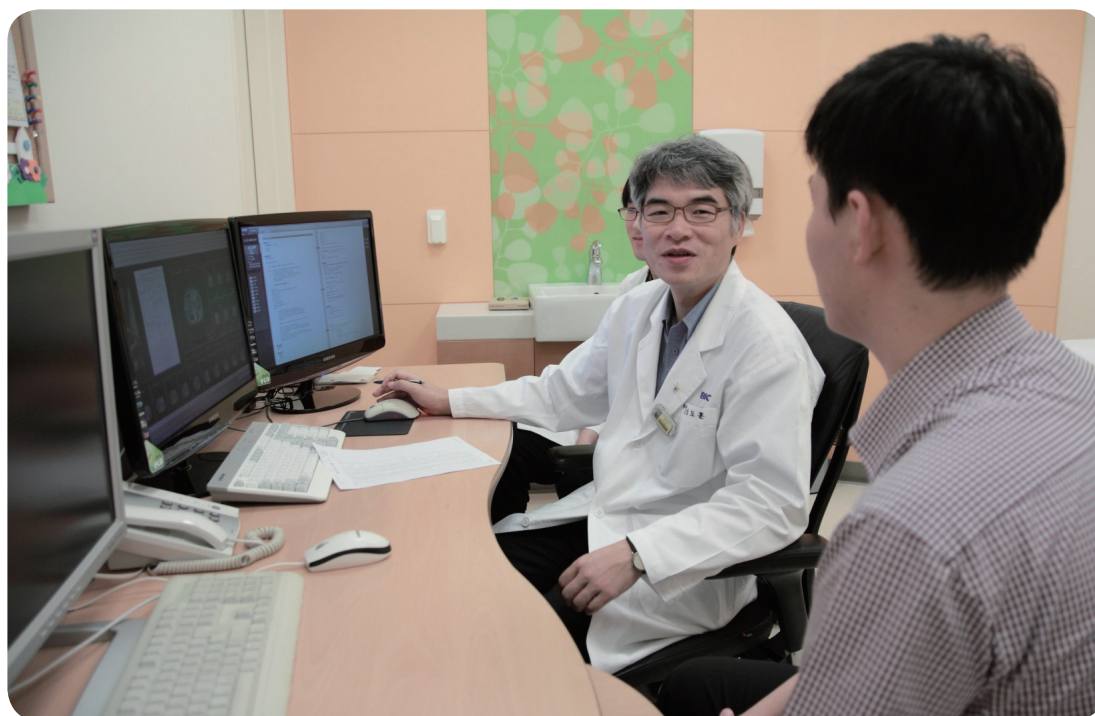
<Intracavitary Treatment Room & Equipment>

Following Up(with your physician)

Patients are scheduled to meet with a medical professional usually once a week during the treatment. If you feel any discomfort or need something, please contact the reception desk for consultation. Consulting may be done without an appointment.

Monitoring the Progress

The progress is monitored after the radiotherapy. Evaluation will be taken to measure the effectiveness of the treatment and look for possible side effects.



<Consulting during the treatment & Observing the progress after the treatment>

Questions regarding symptoms (02-3410-3000)

Please contact the main number of the hospital if you have any questions after radiotherapy.



memo

memo



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