CONVENTIONAL CANCER THERAPIES

This Guide had been provided by Reliable Cancer Therapies (RCT) as a service to patients, to help patients and their relatives better understand the nature of conventional cancer therapies. We recommend patients to ask their doctors which treatments could be useful for their situation. The information described in this document is based on scientific research and has informative purposes only.

More information about Reliable Cancer Therapies: www.reliablecancertherapies.com

For words marked with an asterisk, a definition is provided at the end of the document.*

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INTRODUCTION

This guide for patients provides general information on the main treatments proposed by doctors to treat cancer, and has been approved by national and/or international authorities. The main categories of cancer therapies are surgery, radiotherapy and anti-cancer drugs which include chemotherapy and targeted therapies.

The choice of an optimal treatment will depend on the type of cancer (organ where it has developed and characteristics of the cells) and on how far it has spread from the initial tumor. Your age and your general well-being, your preferences and your needs are also very important in the choice of your treatment.

It is important to know that cancer treatment is complex and one doctor cannot be skilled to perform or give advice for all types of treatment. In addition, there are constantly new findings in cancer research and cancer treatment. Therefore, things can change quite rapidly and it is recommended that every patient's case is discussed by several doctors from different fields (surgeon, organ specialists, medical oncologist*, radiation oncologist*, etc.) to ensure the planning of an optimal treatment. This discussion is often done during a tumor board review.

1. TUMOR BOARD REVIEW

a. What is it?

A tumor board review (also known as multidisciplinary opinion) is part of the approach to treatment planning.

In a tumor board review different cancer specialists discuss and review your medical condition and propose potential treatment options and management according to their field of expertise. These options are called recommendations and help your attending doctor make decisions and discuss them with you and, if you agree, with your family. Your attending doctor is the doctor who guides you and coordinates your treatment. He or she is informed of the progress of your treatment and you can refer to him or her whenever you have questions or need advice.

Tumor board reviews are scheduled over the course of your treatment, so as to guide your treatment. A tumor board review is requested in writing by your attending doctor or another specialist involved in your treatment.

There are tumor board reviews in every hospital treating cancer patients.

Tumor boards do not charge fees for their services.

Not all medical files need to be discussed by a tumor board, but all of them are presented to the board by a patient's attending doctor. The cases to be discussed will be chosen by the tumor board and the individual attending doctor.

b. Who participates?

At least four specialists should participate in a tumor board review, at least one of whom should have experience in oncological surgery or be certified as a specialist in medical oncology*, radiation oncology* or hematology*. This doctor is the coordinator of the meeting.

Clinicians and other health professionals involved in the patient's care should also attend the meeting of the tumor board. Other people, like industry representatives, are not present. The confidentiality of patients is a high priority.

c. What happens during a tumor board presentation?

Your medical file is presented, including the results of your radiology exams, pathology exams and your treatment plan.

After a discussion, they will recommend the next steps for your treatment.

The information from a tumor board review should be made available to you soon afterwards through your attending doctor.

d. What to do with the tumor board recommendations?

The plan has to be discussed with you, and it must be carried out by your attending doctor, who will decide on the best way to proceed. Some patients' medical files could be followed up in subsequent tumor board meetings.

A tumor board review provides diagnostic and treatment recommendations, but it mainly focuses on the latter.

e. Health care team: Who will you see during your treatment?

During your treatment you will see different specialists. Your health care team is usually led by your attending doctor who could be a medical oncologist* or an organ-based specialist*.

- Some other members of your health care team include a:
- Radiation oncologist*
- Surgical oncologist
- Oncology nurse
- Radiation therapist*
- Radiologist*
- Pathologist*
- Social worker
- Dietitian
- Psychologist

2. SURGERY

a. What is it?

Oncological surgery is the oldest type of cancer therapy, and it remains an effective treatment for many types of solid cancer today.

Sometimes the names of some surgeries can seem confusing. They just reflect the technique used, as for example:

- When a laser is used instead of a scalpel, it is called *laser surgery.*
- When extreme cold is used to destroy an abnormal tissue, the procedure is called *cryosurgery*.
- In *endoscopic surgery*, scopes are used to reach the surgical area through small incisions or natural cavities of the body, such as the esophagus.
- In *robotic surgery*, surgery is performed using a computer that remotely controls small instruments. This technique helps the make precisely controlled movements. It can also access to hard-to-reach areas of your body more easily through smaller incisions compared to traditional open and laparoscopic surgery.

Cancer surgery, like all cancer treatments, comes with benefits, risks, and side effects. You must receive information about all this before undergoing this kind of treatment.

b. How does it work?

In most cases, the surgeon* removes the tumor and some tissue around it. Removing nearby tissue may help prevent the tumor from coming back. The surgeon* may also remove some nearby lymph nodes*.

c. The surgical team

A surgical team is a group of highly trained professionals led by a surgeon. The type of surgeon* will depend on the stage and type of cancer you have (i.e. general surgeon, urologist*, urologic oncologist*, neurosurgeon* and so forth).

The team also includes an anesthesiologist*, a nurse who has received specialized training in anesthesia*, another nurse or nurses who assist the surgeon* during surgery, other nurses in the recovery room to monitor patients, pharmacists, social workers, nutritionists* or dietitians and physical therapists.

d. How is the treatment given?

Before surgery you will have a consultation with the surgeon* during which you will be examined and provided with information about the potential benefits and risks of the surgery.

Depending on the surgery, you will receive local, regional or general anesthesia*. Sometimes an intraoperative examination with a pathologist* is done. This examination is limited, and provides information on whether the borders of the tissue removed are free of cancer cells or not, so that there is less probability of leaving behind cancer cells. This examination is also possible when there is uncertainty about whether the tissue to be removed is malignant or not. Lymph nodes* are usually removed along with the tumor and are examined by the pathologist* afterwards. The first lymph node* to which cancer cells are likely to spread from a primary tumor is known as sentinel node. It can be marked with special substances injected near the tumor site to be found, removed and examined. This would give and idea about the possibility of metastases* to the rest of the lymph nodes* and evaluate a full node dissection. Sentinel lymph node* dissection is used in the staging of breast cancer and melanoma* and is under investigation for many other cancers.

e. Where do I go to have surgery?

Mostly to have surgery, you are admitted to the hospital for a period of time. This is called inpatient surgery. Some types of surgery can be performed in a doctor's office, clinic, or surgery center. This is called outpatient surgery.

Some question that you can ask the surgeon* or staff that are going to participate in your surgery are:

- *How long is the procedure going to last?*
- *How long will I be in the hospital?*
- *Will I lose much blood?*
- *Will I need radiotherapy or chemotherapy after the surgery?*
- *What are the side effects of the surgery?*
- *What can I do to ease them?*
- *When are they going to appear?*
- *Are there any side effects that I should report immediately?*
- *Am I likely to have permanent physical problems because of the surgery?*
- *How long will my recovery take?*

f. What about side effects?

The side effects of surgery depend mainly on the size and location of the tumor, and on the type of surgery. It takes time to heal after surgery. The time needed to recover is different for each type of surgery. It is also different for each person. It is common to feel tired or weak for a while.

Common side effects of cancer surgery may include the following ones:

- Pain
- Fatigue
- Loss of appetite
- Swelling around the site of surgery
- Drainage from the site of surgery
- Ecchymosis (bruising) around the site of surgery
- Bleeding
- Infection
- Organ dysfunction

When it comes to the type of surgery other issues should be taken into account, for example diet, if the area where surgery was performed on was located in the gastrointestinal tract. Body image problems can be an issue when, for instance, the bladder is removed, a urostomy (connection between the urinary organs and the skin) may be created during the surgery to divert urine outside the body or a colostomy (connection between the colon and the skin) when the faeces can no longer exit via the anus, due to a surgery in which the rectum was removed or when it is necessary to have the colon rested for a while in which case the colostomy is temporary. Certain types of surgery can affect fertility. In addition, depending on the location of the surgery, both men and women may experience other sexual side effects. For more information on the side effects of surgery in the treatment of different cancers you can take a look at our guides for patients.

There are ways to cope with these side effects; they vary from hospital to hospital. You should always report them to the surgery team, who will then offer you treatment options.

g. What about surgery and nutrition?

➢ *Can I use dietary supplements?*

Before surgery, discontinue any dietary supplements and herbal products that can interact with anesthesia* or affect the formation of red blood cells, thin the blood, or increase blood clotting. Examples of these dietary and herbal supplements include vitamin E, vitamin K, omega-3 fatty acids (fish oil), garlic pills, flaxseed pills, St. John's wort, ginko biloba, and ginger pills. If you have been taking dietary supplements or herbal products, let your surgical team know what you have been using. Your surgeon* or anesthesiologist* will most likely ask you to stop taking these products for

one or two weeks before your scheduled surgery. Once you have recovered from your surgery, check with your doctor before resuming their use.

- ***Is nutrition very important around the time of surgery?***

After surgery the body needs energy and nutrients to heal wounds, to fight infection and to recover. Good nutrition before and after surgery is essential. For every patient, there should be a sufficient intake of food and fluids. Advice and tips from dietitians and/or nutritionists* can help in dealing with this issue. If the patient is malnourished before surgery, it may cause problems during recovery such as poor healing or infection. For these patients, nutrition care may begin before surgery.

After surgery, it is common for patients to have pain, tiredness, and/or loss of appetite. Because of these symptoms, some patients may, for a short time, not be able to eat what they usually do. These side effects can last for weeks or months if the gastrointestinal tract is involved.

Following certain tips about food may help:

- Eat as well as you can on days when your appetite is good. Right after the operation is not a time to feel guilty about what and how much you eat. Try to eat small and frequent meals and snacks every three or four hours or try to eat four to six meals a day, but don't be too hard on yourself if side effects make it hard to eat.
- As you recover, make sure to take plenty of fluids to prevent dehydration (at least eight glasses each day, unless your doctor gives other instructions). Try to drink water, juices, and other clear liquids (such as broth, weak tea, etc.) throughout the day.
- If you have not eaten for more than a day or two, your doctor may advice you to start consuming foods and drinks that are easy to digest. Foods and drinks that are low in fat are easier to digest and tolerate than those that are high in fat. Examples of easy-to-digest foods are plain crackers, white bread, plain pudding and milk shakes, white rice, pasta, potatoes, refined cereals) Be careful with foods that cause gas, like beans or cruciferous vegetables (broccoli, cauliflower and cabbage).
- Choose high-protein and high-calorie foods to increase energy and help wounds heal, such as eggs, cheese, fish, poultry, meat, peanut butter, nuts or ice-cream.
- After surgery, make sure you eat plenty of foods that are good sources of vitamin C, iron, calcium, magnesium, and potassium to aid in healing. Examples of these foods include vegetables, and fruits, dairy products, iron-fortified breakfast cereals, and lean proteins.

Surgery to the head and neck may cause problems with chewing, swallowing, producing saliva and seeing, tasting or smelling food. Surgery that affects the esophagus, stomach or intestines may keep these organs from working as they should in order to digest food and absorb nutrients. All of these problems can affect the patient's ability to eat normally. Emotional stress about the surgery itself may also affect appetite.

➢ ***What if I have problems with food intake?***

Patients who are not able to eat normally and get all the nutrients (vitamins, minerals, proteins, carbohydrates, fat and water) they need, have to avail of nutrition therapy. Nutrition therapy is used to help patients get the nutrients they need to keep up their body weight and strength, keep body tissues healthy, and fight infection.

Nutrition therapy may include the following:

- Nutritional supplement drinks between meals;
- Enteral nutrition gives the patient nutrients in liquid form through a tube that is placed into the stomach or small intestine. The following types of feeding tubes may be used:
    - A nasogastric tube is inserted through the nose and down the throat into the stomach or small intestine. This kind of tube is used when enteral nutrition is only needed for a few weeks.
    - A gastrostomy tube is inserted into the stomach or a jejunostomy tube is inserted into the small intestine through an opening made on the outside of the abdomen. This kind of tube is usually used for long-term enteral feeding or for patients who cannot use a tube in the nose or throat.

  Enteral nutrition is sometimes used when the patient is able to eat small amounts orally, but cannot eat enough to be healthy. Nutrients given through a feeding tube add the calories and nutrients needed for health. Enteral nutrition may continue after the patient leaves the hospital. If enteral nutrition is to be part of the patient's care after leaving the hospital, the patient and caregivers will be trained to provide the nutrition support care at home.
- Parenteral nutrition carries nutrients directly into the blood stream. Parenteral nutrition is used when the patient cannot consume food orally or by enteral feeding. Parenteral feeding does not use the stomach or intestines to digest food. Nutrients are given to the patient directly into the bloodstream, through a catheter (thin tube) inserted into a vein in the chest or in the arm. Parenteral nutrition is used only in patients who need support for five days or more.
    - A central venous catheter is placed beneath the skin and into a large vein in the upper chest. The catheter is put in place by a doctor trained to perform this procedure. This type of catheter is usually used for long-term parenteral feeding.
    - A peripheral venous catheter is placed into a vein in the arm and it is put in place by trained medical staff. This type of catheter is usually used for short term parenteral feeding.

  The patient is regularly checked for infection or bleeding at the place where the catheter enters the body. Parenteral nutrition support may continue after the patient leaves the hospital. In that case the patient and caregiver will be trained to provide the nutrition support care at home. Ending parenteral nutrition support must be done under medical supervision. The parenteral feedings are decreased gradually over time until they can be stopped, or as the patient changes to enteral or oral feeding.

3. RADIOTHERAPY

a. What is radiotherapy?

Radiotherapy is a cancer treatment that uses radiation. Most – but not all - cancers are treated with radiotherapy, especially when other treatments may perform better or if the type of cancer is not sensitive to radiotherapy.

b. How does it work?

Radiation kills cancer cells by damaging their genes and preventing cells from dividing, consequently shrinking the cancerous tumor. Unfortunately radiation can also affect cells surrounding the treated area. New techniques have the goal of increasing the accuracy of the beams used in radiotherapy so that fewer normal cells are damaged.

Radiotherapy can be used to treat the original (primary) cancer or the sites where cancer has spread (metastasized*), such as the bones. It may also be used to ease cancer symptoms. Radiotherapy treats specific problems caused by cancer, such as pain or bleeding. It can also shrink tumors that are pressing against other organs, like the brain or spinal cord, which can cause loss of normal function, e.g. paralysis. It can be given to anyone with cancer symptoms, whatever their stage or type of treatment. It is very important for patients with advanced disease. Radiotherapy may be the only cancer treatment used, but it can also be given along with other therapy or therapies.

c. The radiotherapy team

The radiotherapy team is led by a radiation oncologist*, who is the one that prescribes and coordinates the treatment; a radiotherapy technician, who gives the treatment prescribed and a radiation physicist who ensures the radiation machines are working properly. Other professionals involved are nurses, dietitians, social workers, physiotherapists*, occupational therapists* and psychologists.

d. When is it used?

Radiotherapy is used to:

- Reduce the size of tumors
- Ease cancer symptoms
- Prevent metastases*

Radiotherapy can be the only cancer treatment used, but you will usually receive it along with other therapies.

- **Neo-adjuvant radiotherapy:** Radiotherapy given before surgery to shrink a tumor, making it easier to remove.

- **Adjuvant radiotherapy:** After surgery, when a tumor is removed there may be a risk that some cells are left behind. Radiotherapy is then used with the intention of eliminating cancer cells remaining locally.
- **Chemoradiotherapy:** Radiotherapy can be given at the same time as chemotherapy to reinforce its effect.

e. How is radiotherapy given?

Radiotherapy can be given in three ways: as external radiotherapy (from outside the body), brachytherapy (from inside the body) and radioisotope therapy (from inside the body).
You can have one type of radiotherapy or a combination of them.

1) External radiotherapy:

External radiotherapy is a type of radiotherapy that uses equipment similar to a large x-ray machine. It aims radiation at the cancer from outside the body and is given as a series of short, daily treatments. Before the treatment, a simulation session is planned, supported by tests and scans. During that session the site to be irradiated is defined. The actual treatment is short and normally you should not feel anything.

➢ ***How long is the treatment going to last?***

Each person requires a specific dose of radiotherapy. Each radiation session takes between one and five minutes.
While some people need only one or a few treatment sessions, most people need radiotherapy five days a week for a period of five to eight weeks.

➢ ***Where do I go to get external radiotherapy?***

External radiotherapy is usually given in a hospital.
Some questions that you can ask the radiation oncologist* or the staff who are assisting you, are:

- *What is the goal of the treatment? How are they expecting your cancer to react to the treatment?*
- *How many sessions are you going to have?*
- *How long is the entire treatment going to last?*
- *Can I still have other therapies, such as surgery after the radiotherapy?*
- *Am I going to have more treatment modalities?*
- *What are the side effects of the treatment?*
- *What can I do to ease them?*
- *When are they going to appear?*
- *Is there any permanent damage that I can expect from this therapy?*
- *Are there any symptoms that I should report immediately?*

- ***Will I be radioactive?***

External radiotherapy does not make you radioactive. It is safe to be with other people during the course of the treatment and afterwards.

2) Brachytherapy:

In this type of radiotherapy the radioactive material is placed inside your body, either on or near the cancer. The radioactive material is sealed in an applicator (implant) that is inserted into your body.

There are various types of implants, such as thin tubes, needles, seeds, capsules or rods. The type of implant used depends on the type of cancer.

- ***How long is the treatment going to last?***

Some implants deliver radiation to the body in just a few minutes. This can be an outpatient treatment which may need to be repeated.
Other types of implants are left in place for one to six days. You are likely to stay in hospital for some time. The intensity of the radiation can be high or low.
Some people have small implants or seeds left in place permanently. This is a common treatment for prostate cancer.
When the source of radiation stays permanently, the intensity of the radiation is low. In this case the source of radiation looks like a seed and is implanted, delivering its radiation over a period of approximately three months. After a certain period of time, the seed is considered inactive.

- ***Where do I go to get brachytherapy?***

In brachytherapy, you need to be admitted to a hospital to have the radioactive source implanted in your body. It is likely that you will stay in the hospital for a number of days. Some implants deliver radiation to the body in just a few minutes. This can be an outpatient treatment, which may need to be repeated. Some implants deliver low doses of radiation. This can be an outpatient treatment too, because the radiation does not reach the surface of the body.

Some questions that you can ask your radiation oncologist* or the staff who are assisting you are:

- *What is the goal of the treatment?*
- *How are they expecting your cancer to react to the treatment?*
- *Am I supposed to stay in the hospital? For how long?*
- *How long is the entire treatment going to last?*
- *Can I have visitors?*
- *What are the side effects of the treatment?*
- *What can I do to ease them?*
- *When are they going to appear?*
- *Are there any permanent side effects that could be expected?*

- *How are you going to monitor the sources of radiation implanted after the treatment is finished (in case you are getting permanent sources of radiation implanted)?*
- *Are there any side effects that I should report immediately?*

- ***Will I be radioactive?***

In brachytherapy some radiation may reach the surface of your body.
The hospital staff will leave the room while the treatment takes place and watch from another room. Once the implant is removed, there is no more radioactivity and it is safe to interact with others.
If you have a permanent implant, you may need to stay in an isolated room for the first few days. The implant becomes less radioactive each day. By the time you are at home, the radiation in your body will be weak and it will be safe to be with others, but contact with children and pregnant women should still be restricted.

3) Radioisotope therapy:

Radioisotope therapy is a type of radiotherapy using radioactive substances, such as radioactive iodine (^{131} I) or a mono-clonal antibody* with a radioactive substance attached to it. The latter is also called radioactively labeled mono-clonal antibody*. Radioisotope therapy can be swallowed or injected into the body and travels through the blood, reaching and killing tumor cells.

These radioactive substances deliver radiation to cancer cells. They can target, with certain precision, the part of the body where they are going to work. When combined with mono-clonal antibodies* that bind to specific antigens on the surface of cancer cells, the radioactive substance delivers its energy more precisely. This treatment modality is called tumor-targeted radioisotope therapy.

- ***How long is the treatment going to last?***

Radioisotope therapy is given as a single intervention but you may need to stay in a special room in the hospital for a number of days after the radioactive sources have been swallowed or injected. Radioisotope therapy can sometimes be given on an outpatient basis.

- ***Where do I go to have radioisotope therapy?***

You have radioisotope therapy in a special room in a hospital and remain there after the radioactive sources have been swallowed or injected as safety measure for your visitors (see the next section). Sometimes this kind of radiotherapy can be given on an outpatient basis. Counseling should be given by the radiotherapy team.

Some questions that you can ask your doctor or the staff who are assisting you are:

- *What is the goal of the treatment?*
- *How are they expecting your cancer to react to the treatment?*
- *For how long will I receive this therapy?*
- *Can I have visitors?*

- *What can I do to avoid exposing my friends and family to radiation?*
- *How long do I have to take these measures?*
- *What are the side effects of the treatment?*
- *What can I do to ease them?*
- *When are they going to appear?*
- *Are there any side effects that I should report immediately?*
- *Can I take other medications while receiving this therapy?*

- ***Will I be radioactive?***

In radioisotope therapy some of the radioactive sources will be excreted from the body through bodily fluids such as saliva, sweat and urine. Within a few days most of the radiation is gone, but until the high levels of radioactivity are gone you have to take certain safety measures or precautions, especially concerning visitors (children and pregnant women).

f. What about radiotherapy side effects?

Side effects of radiotherapy vary considerably and depend on the area of the body being treated. Two people having the same treatment may react differently to it. Reactions can also vary from one period of radiotherapy to the next. Having side effects does not mean that radiotherapy is working properly and vice versa. To establish the effectiveness of the therapy, doctors have to perform special examinations. Some side effects associated with radiotherapy are:

- Feeling tired and lacking energy
- Skin problems
- Hair loss
- Loss of appetite
- Nausea
- Diarrhea
- Sexuality and fertility issues
- Sore mouth and gums
- Face, mouth, neck and chest problems.

There are ways to cope with these side effects. You should always report them to the radiotherapy team and they will offer you some treatment options.

g. What about radiotherapy and nutrition therapy?

Radiation therapy* can kill cancer cells and healthy cells in the treatment area. The amount of damage depends on the part of the body that is treated and on the total dose of radiation and how it is given. Radiotherapy to any part of the digestive system often causes side effects related to nutrition. Most of the side effects begin a few weeks (starting around the second or third week) after radiotherapy begins and go away a few weeks after it has finished. Some side effects can continue for months or years after the treatment ends.

The following are some of the most common side effects:

- **for radiotherapy to the head and neck (tongue, voice box, tonsils, salivary glands, nasal cavity, pharynx) :** loss of appetite, changes in the way food tastes, dry mouth or thick saliva, pain when swallowing, narrowing of the upper esophagus which can cause choking, breathing and swallowing problems.
- **for radiotherapy to the chest (lungs, esophagus, breast):** infection of the esophagus, trouble swallowing, esophageal reflux (a backward flow of the stomach contents into the esophagus).
- **for radiotherapy to the abdomen** (**large or small intestine, prostate, cervix, uterus, rectum**): diarrhea, nausea, vomiting, inflamed intestines or rectum, gas, changes in urination, tiredness, intolerance of dairy products and a decrease in the amount of nutrients absorbed by the intestines.

Radiotherapy may also cause tiredness, which can lead to a decrease in appetite.

Nutrition therapy during radiation therapy* can help the patient get enough protein and calories throughout the treatment, prevent weight loss, help wound and skin healing, and maintain general health.

Remember these tips:

- Try to eat something at least an hour before treatment rather than going in on an empty stomach, unless you received different instructions from your radiation center.
- Make sure to drink liquids with small, frequent meals if the food does not taste good, hurts going down, or causes diarrhea.
- Try to eat small, frequent snacks rather than 3 large meals a day. If your appetite is better at certain times of the day, then plan on having your largest meal then.
- Be sure to drink plenty of water and other liquids.

Patients who receive high-dose radiotherapy to prepare for a bone marrow transplant may have many problems related to nutrition and should see a dietitian for nutrition support. They might need nutrition therapy such as nutritional supplement drinks between meals, and enteral nutrition.

➢ ***What is enteral nutrition?***

Enteral nutrition gives the patient nutrients in liquid form through a tube that is placed into the stomach or small intestine. The following types of feeding tubes may be used:

- **A nasogastric tube** is inserted through the nose and down the throat into the stomach or small intestine. This kind of tube is used when enteral nutrition is only needed for a few weeks.
- **A gastrostomy tube** is inserted into the stomach or a jejunostomy tube is inserted into the small intestine through an opening made on the outside of the abdomen. This kind of tube is usually used for long-term enteral feeding or for patients who cannot use a tube in the nose or throat.

Enteral nutrition is sometimes used when the patient is able to eat small amounts orally, but cannot eat enough to be healthy. Nutrients given through a feeding tube add the calories and nutrients needed for good health. Enteral nutrition may continue after the patient leaves the hospital. If enteral nutrition is to be part of the patient's care after leaving the hospital, the patient and caregivers will be trained to do the nutrition support care at home.

4. CHEMOTHERAPY

a. What is it?

Chemotherapy is a type of cancer treatment using drugs that kill cancer cells and/or limit their growth. However it can affect normal cells in the same way. These drugs are usually administered to the patient by slow infusion into a vein, but can also be administered orally, or also by direct infusion to the limb or by infusion to the liver, according to cancer location.

Not all cancers are treated with chemotherapy, especially when other treatments may perform better or if the type of cancer is not sensitive to drugs.

You can find more information about specific anticancer drugs on our website.

b. How does it work?

Drugs can kill fast-dividing cells like cancer cells. Unfortunately, there are normal fast-dividing cells that can also be damaged, such as hair follicles. That is why hair loss is a common side effect of chemotherapy. Chemotherapy drugs damage cancer cells (or their genes) directly, preventing cell division, and consequently limiting the growth of the cancerous tumor.

c. When is it used?

Everyone's treatment is individual; there are national and international recommendations but adjustments can be made according to each patient.
Chemotherapy may be the only cancer treatment used, but you will usually undergo it along with other therapies.

- **Neo-adjuvant chemotherapy:** Chemotherapy is administered before the main treatment (surgery or radiotherapy) to shrink a tumor and make it easier to treat.
- **Adjuvant chemotherapy:** Chemotherapy can be given after surgery or radiotherapy with the goal of eliminating remaining cancer cells.
- **Chemoradiotherapy:** Chemotherapy given at the same time as radiotherapy has a synergistic effect.

Chemotherapy is also used before a bone marrow or stem cell transplant, to destroy the pre-existing cancerous cells i.e. in the case of leukemia. This is called myeloablation* or myelosuppression*.

d. How is chemotherapy given?

This kind of treatment can be given by injecting the drug into a vein or by drip infusion, or orally if the drug comes in capsule or tablet form. Sometimes it can be injected into a muscle in your leg or buttock, under the skin, into an artery, the fluid around the spinal cord, or other body cavity,

e.g. bladder (here the drug flows in through a tube and will be drained out some time later), or directly into the tumor.

When you need frequent or continuous administration of chemotherapy into a vein, a **portacath** is implanted. A portacath is a small device that consists of a reservoir (the portal) and a tube (the catheter). It is implanted under the skin and the catheter enters a large vein in the lower neck. It is completely under the skin so swimming and bathing should not be a problem. A part of the portal is made of a special self-sealing silicone rubber. It can be punctured many times and therefore can be used for a long time. The port is accessed by puncturing through the overlying skin with a special needle. The portacath could also be used to take blood samples, to deliver antibiotics, nutrition and blood products (blood transfusions).

Chemotherapy can also be directly applied to the skin in the form of a cream (i.e. in the case of non-melanoma skin cancer). Sometimes two or more ways of administering the chemotherapy may be used together.

e. Where do I go to get chemotherapy?

The place where the treatment is going to be administered depends on the drug prescribed and its way of being given. Most intravenous drugs are given during visits to a day hospital or clinic and can last from half an hour to a couple of hours. You may need to stay overnight. The treatment can also be given slowly, taking days or even weeks. Sometimes you may be able to have your treatment at home. Doctors and/or nurses will explain the treatment plan to you beforehand.

Some questions that you could ask are:

- *What is the goal of the treatment?*
- *How are they expecting your cancer to react to the treatment?*
- *What is the standard care for your type of cancer?*
- *What drugs are you going to receive?*
- *How many sessions are you going to have?*
- *How long is the entire treatment going to last?*
- *What are the side effects of the treatment?*
- *What can I do to ease them?*
- *When are they going to appear?*
- *Are there any side effects that I should report immediately?*
- *Can I take other medications while I am receiving chemotherapy?*

You should ask as many questions as possible and be sure that you understand everything.

f. How long is the treatment going to last?

The duration and frequency of chemotherapy depends on the type of cancer and the drugs used. You have to visit the hospital regularly for at least three to six months. Depending on the drugs used, each treatment can last from a few hours to a few days.

Each chemotherapy session is called a *cycle*. Each cycle is followed by a rest period. This period helps your body recover from the effects of chemotherapy. The treatment may be delayed if your body needs more time to recover. The number of cycles you receive depends on the stage of

the cancer and how well you respond to treatment. It may take several months to complete the chemotherapy.

g. What about side effects?

Chemotherapy drugs damage cells that divide quickly. Unfortunately normal cells in the blood, mouth, intestinal tract, nose, nails, vagina, and hair also divide rapidly, so they may be affected too. The side effects that are most associated with the damage in the aforementioned cells are:

- Anaemia, bleeding and bruising, due to the damage of blood-forming cells.
- Constipation and/or diarrhea, nausea and vomiting
- Changes in eyesight
- Hair loss
- Changes in hearing
- Infertility
- Kidney and bladder problems
- Loss of appetite
- Confusion and memory problems
- Nerve damage
- Sexual changes
- Skin and nail changes
- Fatigue and tiredness
- Infections

There are ways to cope with these side effects. We will refer to some of them later. You should always report them to your treatment team and they will offer you treatment options. Having side effects does not mean that chemotherapy is working properly and vice versa. To establish the effectiveness of the therapy, doctors have to perform special examinations.

h. What about chemotherapy and nutrition therapy?

Chemotherapy may cause side effects that cause problems with eating and digestion. When more than one anticancer drug is given, more side effects may occur or they may be more severe. The following side effects are common: loss of appetite, inflammation and sores in the mouth, changes in the way food tastes, feeling full after only a small amount of food, nausea, vomiting, diarrhea and constipation.

Patients who have side effects from chemotherapy may not be able to eat normally and get all the nutrients they need to restore healthy blood counts between treatments. Nutrition therapy can help relieve these side effects, helps patients recover from chemotherapy, prevents delays in treatment, prevents weight loss, and maintain general health. Nutrition therapy may include changes in the diets such as eating small meals throughout the day, nutritional supplement drinks between meals and enteral nutrition.

Enteral nutrition gives the patient nutrients in liquid form through a tube that is placed into the stomach or small intestine. The following types of feeding tubes may be used:

- **A nasogastric tube** is inserted through the nose and down the throat into the stomach or small intestine. This kind of tube is used when enteral nutrition is only needed for a few weeks.
- **A gastrostomy tube** is inserted into the stomach or a jejunostomy tube is inserted into the small intestine through an opening made on the outside of the abdomen. This kind of tube is usually used for long-term enteral feeding or for patients who cannot use a tube in the nose or throat.

Enteral nutrition is sometimes used when the patient is able to eat small amounts orally, but cannot eat enough to be healthy. Nutrients given through a feeding tube add the calories and nutrients needed for good health. Enteral nutrition may continue after the patient leaves the hospital. If enteral nutrition is to be part of the patient's care after leaving the hospital, the patient and caregivers will be trained to do the nutrition support care at home.

A few tips about nutrition and chemotherapy:

- Be sure to drink plenty of water or liquids (at least 8 glasses each day).
- Don't be too hard on yourself if side effects make it hard to eat.
- Don't eat too much greasy and fried food, which can be hard to digest.
- On days when you are feeling well and your appetite is good, try to eat regular meals and snacks.
- Make sure you eat something before getting your treatment.
- Some side effects of chemotherapy go away within hours of getting treatment. If your side effects persist, tell your healthcare team.

Paying close attention to nutrition-related side effects can help keep up your weight and energy levels and help you to feel better.

5. TARGETED CANCER THERAPIES

Targeted cancer therapies are drugs or other substances that block the growth and spread of cancer by interfering with specific molecules involved in tumor growth and progression. Targeted cancer therapies focus on certain cellular and molecular changes specific to cancer. The objective is to cause less damage to non-cancerous cells that do not have such characteristics.

They are currently a component of the treatment of many cancers, including breast, colorectal, lung, and pancreatic cancers, as well as lymphoma, leukemia, and multiple myeloma.

Immunotherapy in cancer is a modality that uses the immune system*'s own capacity of protecting the body from cancers, by either injecting man-made antibodies to fight the cancer cells or stimulating the immune system* to kill off the cancer cells.

Depending on the route of administration (intravenously, orally or otherwise) they can be given in an inpatient or outpatient setting.

You can find more information about specific targeted cancer therapies and immunotherapy on our website.

6. HORMONE THERAPY FOR CANCER

Hormones help some types of cancer cells to grow, such as breast cancer and prostate cancer. Hormone therapy in cancer is a kind of treatment that may involve taking medications that interfere with the activity of hormones or stop their production. They are specifically directed to the cells that produce the hormone or to the cells where the hormone is active. Hormone therapy may involve surgical removal of the gland that is producing hormones (testicles in prostate cancer and ovaries in breast cancer).

Specific tests should be done before starting this therapy so that it is certain that the cancer is sensitive to the use of hormones.

More information about hormonal therapies is available on our website.

7. STEM CELL TRANSPLANTATION FOR LEUKEMIAS, LYMPHOMAS AND MULTIPLE MYELOMA

A stem cell transplant is the infusion of healthy stem cells into your body. Stem cells are blood- forming cells. It is also known as a bone marrow transplant or an umbilical cord blood transplant, depending on the source of stem cells. Doctors can use your own cells or cells from donors. It is used mainly in blood cancer and other conditions.

It is used in cancers such as leukemia, where the bone marrow cells have to be destroyed by chemotherapy since they no longer produce healthy blood cells. The healthy stem cells are infused and they can start normal cell production. In addition, immune factors in the transplanted cells may help destroy any cancer cells that remain in your bone marrow.

In lymphomas, it allows for the use of high doses of drugs when the disease does not respond well to treatment or if the disease comes back after treatment. Drugs damage fast-dividing cells, such as the cells in the bone marrow. As these cells form the cells of the blood, high doses of drugs can consequently cause severe damage to bone marrow cells and lethal shortages of blood cells. Stem cell transplantation provides the patient with blood-forming stem cells to restore the bone marrow.

Myeloma cells normally are in the bone marrow so that drugs meant to destroy myeloma cells can destroy normal cells in the bone marrow. In order to restore the normal bone marrow, the patient will need stem cell transplantation.

- ***What about nutrition therapy and a stem cell transplant?***

Chemotherapy, radiotherapy and medicines used for a stem cell transplant may cause side effects that keep a patient from eating and digesting food as usual. Common side effects that can occur are the following: changes in the way food tastes, dry mouth or thick saliva, mouth and throat sores, nausea, vomiting, diarrhea, constipation, weight loss , loss of appetite and weight gain.

Nutrition therapy is very important for patients who have had a stem cell transplant.

Transplant patients need plenty of protein and calories to get through and to recover from the treatment, to prevent weight loss, fight infection and maintain general health. It is very important to avoid infection from bacteria in food.

Nutrition therapy during transplant treatment may include the following:

- a diet of cooked food, because raw vegetables and fresh fruit may carry harmful bacteria;
- guidelines on food safety;
- a specific diet based on the type of transplant and the part of the body affected by cancer;
- parenteral nutrition during the first few weeks after the transplant, to give the patient the calories, protein, vitamins, minerals and fluid they need to recover.

More information about this therapy can be found on our website.

8. SUPPORTIVE CARE (SYMPTOM RELIEF)

There are treatments that are given to the patient as part of cancer therapy that are not meant to treat the cancer itself, for example:

- **Antiemetics:** They are used for management of treatment-related nausea and vomiting (emesis). Many antiemetic drugs act by competitively blocking receptors for neurotransmitters, thereby inhibiting stimulation of the vomiting center in the brain.
- **Pain killers:** Chronic pain is prevalent in cancer patients. It may result from direct invasion of a tumor into nerves, bones, muscles, ligaments, and fascia, and may induce visceral pain through distension and obstruction. First the main source of pain should be treated, for example surgery to debulk a tumor or radiotherapy to shrink it.
  Non-opioid drugs are useful in the management of mild to moderate pain. Symptomatic treatment of severe cancer pain should begin with an opioid. Some analgesics used are morphine, codeine and acetaminophen.
- **Treatment of mucositis:** Mouth sores (oral mucositis) are the inflammatory reaction of the lining of the mouth to chemotherapy and radiotherapy. This causes discomfort while eating, speaking, and swallowing, to mention but a few symptoms. There is currently no effective treatment for it, so mucositis will be experienced until the treatment is complete. Despite not being treatable, there are some ways to prevent and relieve it.

9. GLOSSARY

Anesthesia
Reversible state of loss of awareness in which the patient feels no pain, has no normal reflexes, and responds less to stress, induced artificially by the employment of certain substances known as anesthetics. It can be complete or partial and allows patients to undergo surgery**.**

Anesthesiologist
A doctor who specializes in giving drugs or other agents to prevent or relieve pain during surgery or other procedures being done in the hospital.

Hematologist
This is a specialist in diagnosing and treating blood diseases. He or she studies the blood and tissues which form blood, such as the spleen and bone marrow. The diseases treated by this specialist are leukemia, lymphomas or multiple myelomas, to mention but a few.

Immune system
The immune system is a biological system of structures and processes that protects the body from diseases by identifying and killing tumor cells and foreign invaders such as viruses and bacteria.

Lymph node
A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph and they store lymphocytes. They are located along lymphatic vessels. Also called lymph gland.

Medical oncologist: You usually see this specialist very often. He or she takes care of your general well-being and coordinates your treatment options with other specialists. This specialist is in charge of chemotherapy, hormone therapy and immunotherapy. You will see your medical oncologist even after you have completed your treatment to have regular check-ups.

Melanoma
A darkly-pigmented, malignant, frequently widely metastasizing* tumor arising from a melanocyte and occurring most commonly in the skin.

Metastasis
The spread of cancer from one part of the body to another. A tumor formed by cells that have spread is called a metastatic tumor or a metastasis. The metastatic tumor contains cells that are like those in the original tumor.

Mono-clonal antibody
A type of protein made in the laboratory that can bind to substances in the body, including tumor cells. There are many kinds of monoclonal antibodies. Each monoclonal antibody is made to find one substance. Monoclonal antibodies are being used to treat some types of cancer and are being studied in the treatment of other types. They can be used alone or to carry drugs, toxins, or radioactive materials directly to a tumor.

Myeloablation
A severe form of myelosuppression*. Myelosuppression* is a condition in which bone marrow activity is decreased, resulting in fewer red blood cells, white blood cells, and platelets. It is a side effect of some cancer treatments. Also called severe myelosuppression.

Myelosuppresion
A condition in which bone marrow activity is decreased, resulting in fewer red blood cells, white blood cells, and platelets. Myelosuppression is a side effect of some cancer treatments. When myelosuppression is severe, it is called myeloablation*.

Neurosurgeon
A doctor who specializes in surgery on the brain, spine, and other parts of the nervous system.

Nutritionist
A nutritionist is a health professional who advises on matters of food and nutrition impacts on health. Some use the terms "dietitian" and "nutritionist" as basically interchangeable. However, there are important differences between countries regarding the training needed to be recognized as a nutritionist or as a dietitian. In some countries, any person may call themselves a nutrition expert even if they are wholly self-taught.

Occupational therapist
A health professional trained to help people who are ill or disabled learn to manage their daily activities.

Organ-based specialist: This is a medical doctor whose work is focused on one organ, system or function of the body. Examples include a gastroenterologist, who specializes in diseases of the gastrointestinal system or a dermatologist who specializes in diseases of the skin.

Pathologist
A doctor specialized in histopathology which is the study of diseased cells and tissues using a microscope.

Physiotherapist
A physiotherapist is a health professional that treats patients with physical difficulties resulting from illness, injury, disability or aging. To assist the rehabilitation process they use manipulative techniques (such as massage), exercise, movements and technological equipment. This professional is also known as physical therapist.

Radiation oncologist: This specialist treats cancer with radiation. He or she is different from a radiologist* - another specialist who performs imaging tests to diagnose and follow up on different conditions. In our radiotherapy section you can find more information about the types of radiotherapy that are available.

Radiation therapist
A radiation therapist is a health professional who administers radiotherapy to patients and plans the treatment according to the prescribed doses. The level of training of this professional varies depending on the country, because of that in some countries besides operating the radiotherapy equipment, they can prescribe treatments. This professional is also known as radiotherapeutic radiographer and radiotherapist.

Radiologist
A doctor specialized in the diagnosis of disease and injury with the use of imaging devices such as X-ray, CT-scan or MRI (magnetic resonance imaging).

Surgeon in oncology
Surgery is performed by a general surgeon. Nevertheless, some general surgeons can specialize in certain organs, for example the colon and rectum, breast, skin or endocrine system. In other cases surgery can be performed by other surgeons, for example a gynecologist or urologist*, depending on the organ to be treated.

Urologic oncologist
A doctor who specializes in treating cancers of the male and female urinary tract and the male reproductive organs.

Urologist
A doctor who specializes in diseases of the urinary organs in females and the urinary and sex organs in males.