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What is Chemotherapy? [1]

This is the first article in a three-part series, and it provides an overview of the basics of chemotherapy. The other articles in this series address what to expect when receiving chemotherapy[2] and the side effects of treatment[3].

Chemotherapy is the use of drugs to kill cancer cells. However, when most people use the word chemotherapy they are referring specifically to drug treatments for cancer that destroy cancer cells by stopping their ability to grow and divide. Your doctor may call this standard chemotherapy, traditional chemotherapy, or cytotoxic chemotherapy. These powerful medications circulate in the bloodstream and directly damage the cells that are actively growing. Because cancer cells generally grow and divide faster than normal cells, they are more susceptible to the action of these drugs. However, damage to healthy cells is unavoidable, and this damage accounts for the side effects linked to these drugs.

Several other types of drugs are also used to treat cancer, including hormone therapy and various types of ?targeted? therapy. In fact, many of the drugs recently approved for use in cancer treatment fall into these categories. Because these treatments are much more specific to cancer cells, there is usually less damage to normal cells, leading to different side effects. Learn more about targeted therapy [4] and immunotherapy [5].

Uses of traditional chemotherapy

Chemotherapy is often used as an adjuvant treatment (treatment given after surgery or radiation therapy) to kill any cancer cells that remain. It may also be used as neoadjuvant therapy (treatment given before surgery or radiation therapy to shrink tumors). For cancers of the blood or lymph system, such as leukemia and lymphoma, chemotherapy may be the only treatment given. In addition, chemotherapy is used to treat recurrent cancer (cancer that comes back after treatment) or metastatic cancer (cancer that has spread to other parts of the body).

Goals of chemotherapy

The goals of treatment with chemotherapy depend on the type of cancer and how much it has spread. In some situations, the primary goal of chemotherapy is to eliminate cancer cells and prevent recurrence. If it is not possible to eliminate the cancer, chemotherapy may be used to control the cancer by slowing its growth and/or to reduce symptoms caused by the cancer (called

palliative therapy). Learn more about palliative care [6].

The chemotherapy treatment plan

More than 100 drugs are available to treat cancer. Often, medical oncologists, doctors who specialize in treating cancer with medication, will combine drugs to more effectively treat a patient's cancer. The drug or combination of drugs?as well as the dose and treatment schedule?that the doctor recommends depends on many factors, including the type and stage of cancer (describes the size and location of the tumor and whether it has spread); the patient's overall health, age, and ability to cope with certain side effects; the presence of other medical conditions [7]; and previous cancer treatments.

Depending on the type of chemotherapy recommended, some people may receive treatments in their doctor?s office, at an outpatient clinic, or at the hospital, while others may take the chemotherapy at home. Some chemotherapy regimens (schedules) consist of a specific number of cycles given over a specific period of time, while others are given for as long as they are effective against the cancer.

Many of the traditional chemotherapy drugs cannot be given every day without causing serious side effects. As a result, they are usually given intermittently, with periods of treatment followed by periods of recovery. This allows healthy (noncancerous) cells time to heal. For example, a patient may receive one week of treatment followed by three weeks of recovery (one cycle). Several of these cycles complete a course of chemotherapy, which generally lasts three months or longer. For some cancers, it may be beneficial to use a dose-dense schedule, meaning there is less recovery time between treatment cycles. Although this can improve the effectiveness of the chemotherapy for some types of cancer, it also increases the risk of side effects. Talk with your doctor about the schedule that will work best for you.

Ways of receiving chemotherapy

Intravenously (IV). The medication goes directly into a vein. Many of the traditional chemotherapy drugs are given by this method. A dose of IV chemotherapy usually lasts a few minutes to a few hours; however, a few drugs are more effective when given at a slow continuous rate for a few days or weeks at a time.

Orally. Some of the traditional chemotherapy drugs can be taken by mouth, meaning they are swallowed as a pill, capsule, or liquid. This is becoming a much more common method of administration, particularly with newer targeted therapies.

As an injection. The medicine is given as a shot to a muscle or to the fatty part of the arm, leg, or abdomen.

Intra-arterially (IA). The medicine goes directly into the artery that supplies blood to the cancer.

Intraperitoneally. The medicine goes directly into the abdomen or peritoneal cavity (the part of the body that contains the intestines, liver, stomach, and?in women?ovaries).

Topically. The medicine is applied as a cream and rubbed into the skin.

Other types of drug treatment for cancer

Traditional chemotherapy drugs remain an important part of treatment for most types of cancer. However, many newer cancer drugs target processes that are specific to cancer cells but not normal cells, and therefore have different side effects. They are sometimes used alone but are usually given in combination with traditional chemotherapy.

Hormone therapy. These treatments change the amount of hormones (natural chemicals that circulate in the bloodstream and regulate the activity of certain cells or organs) in the body, which helps because several types of cancer?including some breast [8] and prostate [9] cancers?can only grow and spread when certain hormones are present.

Targeted therapy. These treatments target specific genes, proteins, or the tissue environment that contributes to cancer growth and survival. As a result, this type of treatment blocks the growth and spread of cancer cells while limiting damage to normal cells.

Immunotherapy. This type of treatment is designed to boost the body's natural defenses to fight the cancer. It uses materials made either by the body or in a laboratory to bolster, target, or restore immune system function.

More Information

ASCO Answers Fact Sheet : Chemotherapy (PDF) [10]

Types of Treatment [11]

Additional Resources

National Cancer Institute: Questions and Answers About Chemotherapy [12]

Chemocare.com: What is Chemotherapy? [13]

Links:
[1] http://www.cancer.net/navigating-cancer-care/how-cancer-treated/chemotherapy/what-chemotherapy
[2] http://www.cancer.net/node/24473
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