



This Month's Topic: Treatment - Chemotherapy

Background Information

Chemotherapy is a distinctively different approach than surgery and radiation therapy to treat cancer. Rather than physically removing a tumor or a part of it, chemotherapy uses chemical agents (anti-cancer or cytotoxic drugs) to interact with cancer cells to eradicate or control the growth of cancer.

In chemotherapy, drugs that interfere primarily with DNA synthesis and mitosis are used to destroy cancer cells. Different agents work through many different mechanisms: some damage a cell's genetic material (DNA); some prevent the cell from dividing.

Chemotherapy may be given prior to surgical resection or radiation therapy to shrink the tumor and make it easier to resect. This type of chemotherapy is called neo-adjuvant, induction, or preoperative chemotherapy. As a palliative therapy, chemotherapy can be used to help make the cancer patient's life as comfortable as possible.

Sources:

SEER Training Modules, Cancer Treatment – Chemotherapy. U. S. National Institutes of Health, National Cancer Institute. <http://training.seer.cancer.gov/treatment/chemotherapy/therapy.html>.

Types of Chemotherapy Drugs

How differently these chemotherapy drugs kill cancer cells, or prevent them from dividing, will depend on their classification. Drugs in the same class kill cancer cells by the same mechanism: they all attack the same target within the cell.

These can be administered orally (oral chemotherapy), or injected into a muscle (intramuscular injection), injected under the skin (subcutaneous injection), or into a vein (intravenous chemotherapy). In special cases, they may be injected into the fluid around the spine (intrathecal chemotherapy). No matter what method is used, chemotherapy drugs are absorbed into the blood and carried around the body.

• Alkylating Agents

- Were among the first anti-cancer drugs and are the most commonly used agents in chemotherapy today.
- Act directly on DNA, causing cross-linking of DNA strands, abnormal base pairing, or DNA strand breaks, thus preventing the cell from dividing.

- Although used for most types of cancer, they are generally of greatest value in treating slow-growing cancers.
- Examples: **chlorambucil, cyclophosphamide, thiotepa** and **busulfan**.
- **Antimetabolites**
 - Mimics nutrients that the cell needs to grow, tricking the cell into consuming them, so it eventually starves to death.
 - Examples: **purine antagonists, pyrimidine antagonists** (aka 5-FU) and **folate antagonists**.
- **Plant Alkaloids**
 - Antitumor agents derived from plants.
 - Examples: **vincristine, paclitaxel** and **etoposide**.
- **Antitumor Antibiotics**
 - They are not the same as antibiotics used to treat bacterial infections.
 - These drugs cause the strands of genetic material that make up DNA to uncoil, thereby preventing the cell from reproducing.
 - Examples: **Doxorubicin, Mitoxantrone** and **Bleomycin**.

Sources:

SEER Training Modules, Cancer Treatment – Chemotherapy. U. S. National Institutes of Health, National Cancer Institute. <http://training.seer.cancer.gov/treatment/chemotherapy/therapy.html>.

Chemo Care, Types of Chemotherapy and Chemo Treatments. http://www.chemocare.com/whatis/types_of_chemotherapy.asp.

Most Common Chemotherapy Modes

Chemotherapy drugs can be given in a variety of different ways. Below you will see the most common ways in which chemotherapeutic agents are delivered.

- **Intravenous (IV) Infusions**
 - Intravenous administration of therapy medication allows for rapid entry into the body's circulation, where it is carried throughout the body in the blood stream.
 - This is the most common method of chemotherapy administration, since most chemo drugs are easily absorbed through the blood stream.
 - Intravenous administration offers the most rapid absorption time of all currently available methods and the most versatile.
 - Continuous infusions can be given over a few days or for weeks at a time.
 - Examples of IV Chemotherapy drugs include **Carboplatin, Cyclophosphamide, Docetaxel** and **Doxorubicin**.
- **Oral Medications**
 - Oral chemotherapy medications - those that can be swallowed - come in a variety of oral forms (pills, tablets, capsules, liquid) all of which can be absorbed by the stomach or under the tongue.
 - Since most drugs are not given in oral form, not all types of cancer have oral chemotherapies available.

- The majority of chemotherapy drugs are administered intravenously, but the oral chemotherapeutic drugs are just as effective.
- Examples of oral chemotherapy agents include: **Xeloda (Capecitabine)**, **Etoposide** and **Gleevec**.

- **Intraventricular/Intrathecal Treatment**

- Refers to chemotherapy drugs that are injected into the fluid-filled space between the thin layers of tissue that cover the brain and spinal cord.
- Used when drugs need to reach the cerebrospinal fluid (CSF), the fluid that is in the brain and spinal cord.
- The body's blood-brain barrier does not allow many chemotherapy drugs given systemically (through the whole body) to get to the CSF. There are two ways chemotherapy can be given to the CSF:
 - **Lumbar puncture:** Chemotherapy can be given through a lumbar puncture (spinal tap).
 - **Ommaya reservoir:** The ommaya reservoir is a small dome-shaped device with an attached catheter. It is placed into the subcutaneous tissue (the layer of tissue between the skin and the muscle) on the scalp.

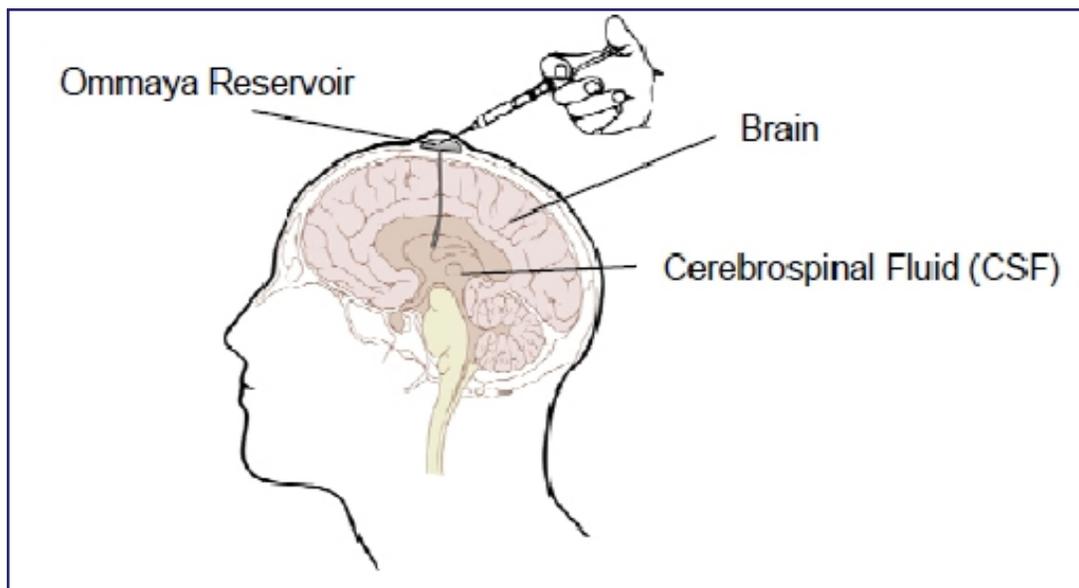


Image Source: Nottingham University Hospital.

[http://www.nuh.nhs.uk/foi/services/patient information/leaflets/nuh leaflets/0769v10210 Intraventricular chemotherapy via an ommaya reservoir.pdf](http://www.nuh.nhs.uk/foi/services/patient%20information/leaflets/nuh%20leaflets/0769v10210%20Intraventricular%20chemotherapy%20via%20an%20ommay%20reservoir.pdf).

For more ways and information, please visit: http://www.chemocare.com/whatis/how_is_chemotherapy_given.asp

Sources:

Chemo Care, How is Chemotherapy Given?

http://www.chemocare.com/whatis/how_is_chemotherapy_given.asp.

LiveStrong, Chemotherapy Drugs. <http://www.livestrong.com/chemotherapy-drugs/>.

Common Coding Misunderstandings and Explanations

• How to code Chemotherapy when only port-a-cath inserted

- A port-a cath is a device that is placed surgically under the skin in the chest in order to give drugs into a large vein or draw blood from it.
- If there is mention within the medical record that a port-a-cath (or something like it) has been inserted, this does not automatically mean that Chemotherapy was given.
- If there is NO mention of chemotherapy having been administered, do NOT assume it has been because of a port-a-cath insertion.
 - DO NOT Code to 01; **Code to 88, "Chemotherapy was recommended, but it is unknown if it was administered."**

• Coding Chemotherapy Regimens

- Chemotherapy regimens consist of multiple agents given at once and in combination and are often identified by acronyms.
- If there are multiple chemotherapeutic agents given as first course treatment, **Code to 03, "Multi-agent chemotherapy was delivered as first course of therapy."**
- In the instance that there is a hormonal agent given with the regimen, code the hormonal agent under "Hormone treatment":
 - CHOP: Cyclophosphamide, Doxorubicin, Oncovin and Prednisone (a hormone).
 - VAD: Vincristine, Adriamycin and Dexamethasone (a hormone).

NOTE: If hormone (such as prednisone, dexamethasone) is **not** given as part of a chemotherapy regimen, it is **not** considered a hormonal agent for cancer treatment purposes.

• Chemotherapy versus Ancillary Agents

- In cancer, an ancillary agent modifies and/or synergizes the effect of other agents (e.g., chemotherapy drugs), while having few if any direct effects when given by itself.
- Although used in combination, **do NOT code** ancillary agents as chemotherapy.
- Examples of ancillary agents are Leucovorin, Mesna, Filgrastim, Epoetin Alfa, Allopurinol and Amifostine.

• 5-FU: Single Agent or Multiple Agents?

- The chemotherapy agent 5-FU (5-Fluorouracil) is only one agent – NOT multiple.
- The "5" in 5-FU is a reference to its actual Systematic (IUPAC) name: "5-fluoro-1H-pyrimidine-2,4-dione."
- Code 5-FU as **Code 02, "Single-agent chemotherapy administered as first course of therapy,"** if that is the only chemotherapy given as first course.

Source:

Wikipedia, Fluorouracil <http://en.wikipedia.org/wiki/Fluorouracil>.

What is SEER*Rx?

- SEER*Rx was developed as a one-step lookup for coding oncology drug and regimen treatment categories in cancer registries.

- The program is free and can be downloaded from the SEER website:
www.seer.cancer.gov/tools/seerrx/index/html.
- The database is scheduled to be updated annually.



Resources

- Texas Cancer Registry *2010 Cancer Reporting Handbook*
- SEER Training Website - Chemotherapy:
<http://training.seer.cancer.gov/treatment/chemotherapy/therapy.html>
- ChemoCare: <http://www.chemocare.com/>
- LIVESTRONG – Cancer Information: <http://www.livestrong.com/cancer-information/>