

FACT SHEET

Chemotherapy

The development of cancer starts by the emergence of a single abnormal cell and like other normal cells, it is capable of dividing itself into two cells. The two cells double into four, the four into eight, and so on, until there are enough abnormal cells to form a lump or tumour which is cancer.

What is Chemotherapy?

Chemotherapy is a treatment for cancer in which special drugs are used in an attempt to destroy the cancerous tumour cells. Chemotherapy works by disrupting the reproductive cycle of cancer cells by acting on their DNA (the genetic material found within each cell) so that they die or cannot duplicate; to prevent or slow down the further production of cancerous cells.

How is Chemotherapy given?

In the setting of brain tumours, often the chemotherapy is given by mouth (orally). Sometimes chemotherapy is given by injection into the vein (intravenously) by specially trained nurses based on the treating doctor's order, usually at a hospital out-patient facility. However, if appropriate, some drugs are given by a special technique called intra-tumoural chemotherapy, by using either small pumps or biodegradable wafers (e.g. Gliadel wafers) to place the drugs inside the tumour during surgery.

Chemotherapy is usually given in cycles. Treatment cycles vary with the drug being given. For example, each cycle might be five days of treatment followed by a 23 days "off" treatment or three weeks "on" chemotherapy and a week "off". This schedule might be repeated only once or twice, or it might continue for a longer period. A chemotherapy schedule is influenced by the purpose and action of the drug. Oral chemotherapy is sometimes given at the same time as radiation (e.g. following the diagnosis of glioblastoma multiforme, which is a high-grade brain tumour).



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Chemotherapy and Brain Tumours

Treating a brain tumour with chemotherapy is different from treating a tumour at other sites of the body. This is due to the blood-brain barrier, which serves as a filter mechanism between the brain and the rest of the body and only allows selected substances into the brain. This barrier could stop some chemotherapeutic drugs from reaching the brain tumour, limiting the effectiveness of the treatment. Fortunately, some chemo- therapeutic drugs such as temozolomide (Temodal), procarbazine (Natulan), lomustine (CCNU) and carmustine (BCNU) can cross the blood-brain barrier.

What are the Effects of Chemotherapy?

Unfortunately, chemotherapy affects both normal and cancerous cells. The damage or destruction of normal cells during or after chemotherapy is the cause of side effects.

Chemotherapy affects some normal cells more severely than others. For instance, cells which regenerate rapidly are also the most vulnerable to side-effects, such as those that line the mouth and the gastrointestinal tract. The results are mouth sores and diarrhoea.

For the same reason, the rapidly dividing cells of the bone marrow such as the white cells, red cells and platelets are also affected. In this case, the patient could be subject to fever or infection while the white cell count is low (neutropaenia). When the red cell count is low, it may lead to anaemia whereas a low platelet count (thrombocytopaenia) may cause severe bleeding. Therefore, regular blood tests are necessary in order to monitor the patient's blood count.

Nausea and vomiting is another major side-effect. Fortunately, these unpleasant experiences are often avoided by the use of anti-emetic (anti-nausea) medications that have been developed specially for chemotherapy.

There may also be other side effects caused by the chemotherapy such as tiredness and rashes. Good general health prior to starting treatment, and maintaining a healthy routine during treatment, helps the body heal itself during and after chemotherapy.