Chemotherapy

Introduction

Chemotherapy is a type of treatment for cancer where medicine is used to kill cancer cells.
It kills the cancer cells by damaging them so they cannot reproduce and spread.

Why chemotherapy is used

Chemotherapy is used if a cancer has spread or if there is a risk that it will. The main aim of treatment may be:
to try to cure cancer completely – this is known as curative chemotherapy
to help make other treatments more effective – for example, chemotherapy can be combined with radiotherapy (where radiation is used to kill cancerous cells), or it can be used before surgery
to reduce the risk of the cancer returning after surgery or radiotherapy
to relieve symptoms – a cure may not be possible for advanced cancer, but chemotherapy may be used to relieve the symptoms and slow the spread of the condition. This is known as palliative chemotherapy
Less commonly, chemotherapy is used to treat non-cancerous conditions. For example, low doses have been used to treat lupus and rheumatoid arthritis.

How chemotherapy is used

There are many different types of chemotherapy medication, but they all work in much the same way. Depending on the type of cancer you have, you may be given treatment with one medication (monotherapy) or with a combination of medications (combination therapy).
There are several ways in which chemotherapy medication can be given, including tablets and injections directly into a vein.
The team caring for you will help come up with a treatment plan for your specific circumstances.

Side effects

Chemotherapy is a very effective cancer treatment that has helped save millions of lives, but it does cause side effects.

The medications used in chemotherapy cannot tell the difference between fast-growing cancer cells and other types of fast-growing cells, such as blood cells, skin cells and the cells inside the stomach.

This means that most chemotherapy medications have a poisonous effect on the body's cells, causing problems that can include:

feeling tired and weak all the time

feeling and being sick

hair loss

Some people only have minimal side effects. However, for most people, a course of chemotherapy can be very unpleasant and upsetting.

Living with and adapting to the side effects of chemotherapy can be challenging. But it's important to realise that most, if not all, side effects will disappear once the treatment is complete.

Some people who are about to start chemotherapy are concerned that the harmful effects of chemotherapy can be passed to other people, particularly people who are vulnerable, such as children or pregnant women. However, there is no risk associated with coming into close contact with someone who is having chemotherapy.

Who can use chemotherapy

As chemotherapy is a potentially life-saving treatment, it's usually recommended for most people with cancer, even if they are in poor health and the treatment is likely to make them feel worse.

Delaying treatment or, in some cases, not having chemotherapy may be recommended if you:

are in the first three months of pregnancy – using chemotherapy during this time has a very high risk of causing birth defects

have low levels of blood cells – chemotherapy can lower your blood cell count more, so it could make you feel very ill and, in some cases, vulnerable to infection (medication and sometimes a blood transfusion may be required to raise your blood cell count)

have severe kidney or liver disease – most chemotherapy medications are processed by your liver and kidneys, so this could have a very harmful effect if your liver and kidneys are already damaged
have had recent surgery or a wound – chemotherapy can disrupt the body's ability to heal wounds, so it's usually recommended that the wound heals before treatment begins
have an ongoing infection – chemotherapy can make you more vulnerable to the effects of infection, increasing your risks of developing serious complications

How chemotherapy is performed
Chemotherapy can be carried out in many different ways, depending on your specific circumstances.
Your care team

Many hospitals use multidisciplinary teams (MDTs) to provide chemotherapy treatment. MDTs are teams of specialists that work together.
Deciding what treatment is best for you can often be confusing. Your care team will recommend what they think is the best treatment option, but the final decision will be yours.
Before going to hospital to discuss your treatment options, you may find it useful to write a list of questions to ask the doctor in charge of your care.
For example, you may want to find out:
what the purpose of your chemotherapy is – for example, whether it's being used to cure your cancer, relieve your symptoms or make other treatments more effective
what side effects you're likely to experience and whether anything can be done to prevent or relieve them
how effective the chemotherapy is likely to be at curing your cancer or at least slowing it down
whether any alternative treatments can be used instead of chemotherapy
Tests

Before chemotherapy begins, you will probably need to have a number of tests to assess your health and to make sure you can cope with any side effects. Tests may also be carried out during treatment to monitor your progress.
The tests you require will depend on the type of cancer you have.

Blood tests

In most cases, a blood test is carried out to assess the health of your liver and kidneys. This is important because chemotherapy medications will pass through your liver and kidneys, where they will be broken down. The medication can harm the liver. Therefore, if you have liver damage, it may not be suitable for you until your liver and kidneys have recovered.
Blood testing can also assess your blood count. This is a measurement of how many blood cells you have.
If you have a low blood count, treatment may be delayed until your blood count has returned to normal. In some cases, medication or a blood transfusion may be required. Your blood count is important because chemotherapy reduces the number of cells in your blood.
Regular blood tests may also be carried out during your treatment so your liver, kidneys and blood count can be carefully monitored.

Scans

Before having chemotherapy, scans may be carried out to help identify the best way to treat you and to provide a reference point so your progress can be checked during treatment.
Several different scans may be used, including X-rays, computerised tomography (CT) scans and magnetic resonance imaging (MRI) scans.

Your treatment plan

You will need to have regular chemotherapy over a set period of time for it to be effective.
Your care team will draw up a treatment plan detailing how many sessions you will need, how long the course should last, and how much time should pass between each session. It is common for there to be a

break after each session to allow your body to recover from the effects of the medication.
This treatment plan is known as a chemotherapy protocol. Chemotherapy protocols vary depending on the type of cancer you have and how advanced it is.
Types of chemotherapy

Chemotherapy is usually given in one of two ways:
as a tablet – which is known as oral chemotherapy
injected directly into a vein – which is known as intravenous chemotherapy
However, chemotherapy medication can be given in many other ways too. For example, it can be injected into the spine (intrathecal chemotherapy) and it can come as a cream that is directly applied to the skin.
The type of chemotherapy used will depend on the type of cancer you have and how advanced it is.
Oral chemotherapy

If you are in good health, you may be able to take your tablets at home. However, you will still need to go to hospital for regular check-ups.
It is very important that you only take your tablets on the days specified in your chemotherapy protocol. If you forget to take a tablet, contact your care team for advice. Also, contact your care team if you are sick shortly after taking a tablet.
Intravenous chemotherapy

A number of different devices can be used to give chemotherapy medication into a vein.
The type of device used will often depend on the type of cancer you have and your general health. You may be able to choose which device you have, although this is not always possible.
Intravenous chemotherapy is not usually like having a vaccine, where you are given one quick injection. Instead, chemotherapy medications are slowly released into a vein over a period of time. The time it takes to give one dose can range from several hours to several days.

Occasionally, some people need a continuous low dose of chemotherapy medication over several weeks or months. If this is the case, you may be given a small portable pump that you can take home with you.
The devices used for intravenous chemotherapy are described below.
Cannula

A cannula is a small tube that is placed into a vein on the back of your hand or lower arm. Chemotherapy medication is slowly injected through the tube into your vein. Once the dose of medication has been delivered, the tube can be removed.
Central line

A central line, also known as a skin-tunnelled catheter, is a fine tube that is inserted into your chest and connected to one of the veins near your heart. The tube can be left in place for several weeks or months, so that you do not have to have repeated injections. It can also be used to carry out blood tests.
Peripherally inserted central catheter

A peripherally inserted central catheter (PICC) is similar to a central line, except the tube is connected to your arm rather than your chest.
Implanted port

An implanted port is a rubber chamber surgically inserted under your skin. It is connected to a vein with a soft plastic tube. Chemotherapy medication is given using a special needle placed through the skin into the chamber. The port is kept in place throughout the course of treatment.
Things to consider

During chemotherapy treatment, there are a number of important things you need to bear in mind.
Other medication

Check with your care team before you take any other medication, including over-the-counter medicines and herbal remedies. Other

medication could react unpredictably with your chemotherapy medication.

Pregnancy

You should avoid becoming pregnant while having chemotherapy. This is because many medications used in chemotherapy can cause birth defects.

You will need to use a barrier method of contraception, such as condoms, while having chemotherapy and for at least six months after your treatment has finished.

Contact your care team immediately if you think you may have become pregnant while having chemotherapy.

Side effects

Chemotherapy usually causes severe side effects such as hair loss, fatigue, nausea and vomiting.

Side effects of chemotherapy

It is difficult to predict exactly what side effects you will experience while having chemotherapy. Different people react to treatment in different ways.

A small number of people have very few or even no side effects.

Many of the common side effects of chemotherapy are listed below, although it is unlikely that you will experience them all.

Your care team is there to help you cope with the physical and psychological side effects.

When to get urgent medical advice

While the side effects of chemotherapy can be distressing, most do not pose a serious threat to your health.

However, occasionally some side effects can be very serious. For example, if you have a rapid fall in white blood cells, you may be vulnerable to a serious infection.

People having chemotherapy for cancer of their blood cells or bone marrow are most at risk of serious infections. This is because this type of cancer will already have caused a reduction in white blood cell numbers.

Symptoms of a serious problem include:
a high temperature of 38°C (100.4°F) or above
shivering
breathing difficulties
chest pain
flu-like symptoms, such as muscle aches and pain
bleeding gums or nose
bleeding from other parts of the body that does not stop after applying pressure for 10 minutes
mouth ulcers that stop you eating or drinking
vomiting that continues despite taking anti-sickness medication
four or more bowel movements a day, or diarrhoea
If you have any of these symptoms, contact your care team immediately. Your care team should give you a card with 24-hour emergency phone numbers.

Fatigue

Fatigue or tiredness is a common side effect of chemotherapy. Almost everyone who has chemotherapy will experience fatigue. You may feel generally tired or you may tire very easily after doing normal, everyday tasks.
While having chemotherapy, it is important to get plenty of rest. Do not carry out tasks or activities that you do not feel up to.
Light exercise, such as walking or yoga, can help boost your energy levels, but be careful not to push your body too hard.
If you are working, you may need to ask your employer to let you work part time until your chemotherapy has finished.
Read more about coping with the effects of tiredness and fatigue.
Contact your care team if you are suddenly significantly more tired than usual and you also feel out of breath. Extreme fatigue and shortness of breath can be a sign of anaemia (see below).
Nausea and vomiting

Nausea (feeling sick) and vomiting (being sick) are common side effects of chemotherapy. They affect around half of all people being treated.

If you have nausea and vomiting, you will be given medication to help control your symptoms. This type of medication is known as an anti-emetic.
Anti-emetics can be given in a number of different ways, including:
as a tablet or capsule, which can either be swallowed or placed under your tongue to dissolve
as an injection or drip
as a suppository, which is a capsule that you put into your rectum (back passage) so that it can dissolve
through a patch that you place on your skin
Continue to take your anti-emetics even if you do not feel sick because they will help prevent your symptoms from returning.
Side effects of anti-emetics include constipation, indigestion, problems sleeping (insomnia) and headaches.
There are several different types of anti-emetics. If the one you are taking doesn't work or if it causes too many troublesome side effects, contact your care team. There may be an alternative anti-emetic that works better for you.
Hair loss

Hair loss is a common side effect of some chemotherapy. It usually begins one to three weeks after the first chemotherapy dose and most people have significant hair loss after one to two months.
The scalp is most commonly affected, although hair loss can occur on other parts of the body. These include the arms, legs and face.
Hair loss can be very traumatic, particularly for women.
If you find hair loss particularly difficult to cope with, talk to your care team. They understand how distressing it can be and will be able to give you support and counselling.

Hair loss due to chemotherapy is almost always temporary, and your hair should begin to grow back soon after your treatment has finished.
Around three-quarters of people no longer wear a wig or use a head covering six months after their chemotherapy treatment has finished.

Many people find that their newly grown hair is different than before. For example, it may be a different colour or it may be curlier or straighter than it used to be.

Cold cap

It may be possible to prevent hair loss due to chemotherapy by using a cold cap.

A cold cap looks similar to a bicycle helmet. It is designed to cool your scalp while you receive a dose of chemotherapy. In cooling the scalp, the cold cap reduces the amount of blood flow to the scalp. This reduces the amount of chemotherapy medication that reaches it.

Whether or not you can use a cold cap during treatment will depend on the type of cancer you have.

For example, a cold cap cannot be used if you have:

various types of leukaemia, such as acute lymphoblastic leukaemia, which is cancer of the blood cells and mainly affects children

multiple myeloma, which is a cancer that develops inside the bone marrow

non-Hodgkin's lymphoma, which is a cancer that develops inside the lymphatic system (a series of glands and vessels that help protect the body against infection)

With these types of cancers, there is a good chance that cancerous cells could have spread to your skull. Therefore, it would be too dangerous to cool your skull.

Cold caps work better with certain types of chemotherapy medications, and they may not always prevent hair loss.

Increased risk of infection

Chemotherapy can reduce you body's ability to fight infection, so you may be given a course of antibiotics to reduce your risk of developing an infection.

You will also need to take extra precautions to protect yourself against infection. For example, you should:

Have good personal hygiene – take daily baths or showers and make sure that clothes, towels and bed linen are washed regularly.

Avoid contact with people who have an infection, such as chickenpox or flu.
Wash your hands regularly with soap and hot water, particularly after going to the toilet and before preparing food and eating meals.
Take extra care not to cut or graze your skin – if you do, clean the area thoroughly with warm water, dry it and cover it with a sterile dressing.
Regular blood tests are often carried out during chemotherapy to identify when you are most vulnerable to infection.
You may be advised to take extra precautions, such as avoiding crowded places and using public transport at busy times.
Anaemia

Chemotherapy will lower the amount of red blood cells. These cells carry oxygen around the body. If your red blood cell count drops too low, your body will be deprived of oxygen and you will develop anaemia.
Symptoms of anaemia include:
tiredness – you will feel much more tired than the general level of fatigue associated with chemotherapy
lack of energy
shortness of breath (dyspnoea)
irregular heartbeat
If you have any of these symptoms, contact your care team as soon as possible.
You may need to have a blood transfusion to help increase the number of red blood cells. Alternatively, a medication called erythropoietin (EPO) can stimulate the production of red blood cells.
It is important to eat a diet that is high in iron. This is because iron helps red blood cells carry more oxygen. Foods that are high in iron include:
dark-green leafy vegetables
iron-fortified bread
beans
nuts
meat
apricots
prunes

raisins

Bruising and bleeding

Chemotherapy can make you more vulnerable to excessive bleeding and bruising. This can cause:
easily bruised skin
nosebleeds
bleeding gums
Report any of these symptoms to your care team as you may need a blood transfusion to raise your platelet count.
You may need to take extra precautions to avoid damaging your skin and gums, including:
using an electric razor to shave
using a soft toothbrush
taking extra care when using knives or other sharp instruments
wearing a thick pair of gloves when gardening

Mucositis

In some cases, chemotherapy can cause pain and inflammation of the soft layer of tissue that lines the digestive system from the mouth to the anus (the mucous membrane). This is known as mucositis.
The severity of your symptoms usually depends on the strength of your medication. People having high-dose chemotherapy usually have more severe symptoms.
The symptoms of mucositis usually begin 7 to 10 days after you start chemotherapy.
If you develop mucositis, the inside of your mouth may feel sore, as if you have burnt it by eating very hot food. You will probably develop ulcers on the lining of your mouth and, in some cases, on your tongue or around your lips.
The ulcers can be very painful and make it difficult to eat, drink and talk. They may also bleed and become infected.
The symptoms of mucositis should clear up a few weeks after your chemotherapy finishes, although a number of medications are available to relieve the symptoms.

Loss of appetite

Some people who have chemotherapy lose their appetite and do not feel like eating or drinking. If you lose your appetite, it is still important to make an effort to eat healthily and drink plenty of liquids.

You may find eating smaller, more frequent meals better than eating three large meals a day. Try sipping drinks slowly through a straw rather than drinking them straight from a glass.

If you have serious problems eating and drinking due to symptoms such as mouth ulcers, you may need to be admitted to hospital and attached to a feeding tube.

You will probably be given a nasogastric tube. This is a tube that passes down your nose and into your stomach. The tube can be removed once you are able to eat and drink normally.

Skin and nails

Some chemotherapy medications can cause your skin to become dry and sore, particularly on your hands or feet. Your nails may become brittle and flakier than usual and white lines may develop across them.

During chemotherapy, and for some time after treatment has finished, your skin may become more sensitive to sunlight. Therefore, it is important to take extra precautions to protect your skin from the sun:

Avoid going out in the sun when it is at its hottest – this is usually between 10am and 2pm, although the sun can also damage skin before and after these times.

Use a sunscreen that blocks both ultraviolet A (UVA) and B (UVB) radiation and has a sun protection factor (SPF) of at least 15.

Dress to protect your skin from the sun – for example, wear a wide-brimmed hat to protect your face and scalp, and sunglasses to protect your eyes.

Memory and concentration

Some people who have chemotherapy have problems with their short-term memory, concentration and attention span. You may find that routine tasks take much longer than usual.

Exactly why these symptoms appear is unclear. They may be due to a combination of factors, such as fatigue and anxiety. However, the symptoms usually improve after your treatment has finished.

Sleep problems

Sleep problems are a common side effect of chemotherapy. They are thought to affect around half of all people being treated with chemotherapy.

Sleep problems can include difficulty falling asleep (insomnia), and waking up in the middle of the night and being unable to get back to sleep.

The following advice may help to improve your sleep:

go to bed only when you are sleepy

if you cannot sleep, leave the bedroom and only return when you feel sleepy

only use your bedroom for sleeping and having sex

avoid napping during the day, if this is not possible, try to limit your naps to about half an hour

avoid stimulants, such as caffeine, for at least six hours before you plan to go to bed

If this advice does not work, contact your care team. You may need additional treatment. A type of therapy called cognitive behavioural therapy (CBT) has proved to be effective in treating insomnia associated with chemotherapy.

Sexuality and fertility

Many people find that their interest in sex decreases during chemotherapy. However, this is usually temporary and your interest in sex should gradually return after your treatment has finished.

Some chemotherapy medications can stop women being able to conceive and can prevent men from producing healthy sperm. Loss of fertility is usually temporary, although in some cases a person can become permanently infertile.

If there is a risk that you could become permanently infertile, your care team will discuss the possibility with you before treatment begins.

A number of options are available. Women can have their eggs frozen to be used later in IVF (in-vitro fertilisation). Men can have a sample of their sperm frozen to be used at a later date for artificial insemination.

Diarrhoea and constipation

You may have diarrhoea or constipation a few days after you begin chemotherapy. Your care team can recommend suitable medication to help control the symptoms.

Find out more about treatment for diarrhoea and treatment for constipation.

Depression

Living with the effects of chemotherapy can be frustrating, stressful and traumatic. It is natural to feel ongoing anxiety and concern about whether your treatment will be successful.

Stress and anxiety can increase your risk of getting depression. You may be depressed if you have been feeling particularly down for two weeks or more and you no longer take pleasure in the things that you used to enjoy.

Contact your care team if you have psychological and emotional difficulties. They will be able to recommend treatments to help improve the symptoms of stress, anxiety and depression.

Joining a support group for people who are having chemotherapy may also help. Talking to other people in a similar situation can often reduce feelings of isolation and stress.

Refusing or withdrawing treatment

In some circumstances, you may think that the benefits of chemotherapy are not worth the poor quality of life due to the side effects of treatment.

For example, if chemotherapy offered no hope of a cure and could only extend your life by a few months, you may feel that the extra few months are not worth undergoing treatment.

However, if you were looking forward to an event such as the birth of a grandchild or the wedding of a son or daughter, you may want to extend your life whatever the cost to your wellbeing.

There is no right answer or recommendation about when chemotherapy should be refused or withdrawn. Your care team can give you advice about the likely benefit of continuing with treatment, but the final decision will be yours.

This is obviously a very sensitive topic that you should discuss fully with your care team, family, friends and loved ones. You always have the right to refuse a particular treatment or to ask for the treatment to be stopped if you do not feel it is benefiting you.

Stopping chemotherapy does not mean that any symptoms you have will go untreated. Your care team will still provide support and pain relief. This type of care is known as palliative care.

If it's thought that you do not have long to live, it may be recommended that you are admitted to a hospice. Hospices provide care for people from the point at which their illness is diagnosed as terminal to the end of their life, however long that may be.