

# AC chemotherapy

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## 1. What is AC chemotherapy?

AC is a combination of two chemotherapy drugs used to treat breast cancer.

It takes its name from the initials of these drugs:

- doxorubicin (also known as Adriamycin)
- cyclophosphamide

## 2. Who might be offered AC chemotherapy?

AC chemotherapy can be used to treat primary breast cancer – breast cancer that hasn't spread beyond the breast or the lymph nodes under the arm. Sometimes it's used in combination with other anti-cancer drugs. Chemotherapy is given to reduce the risk of

breast cancer returning or spreading.

AC chemotherapy may be given before surgery, known as neo-adjuvant treatment (sometimes called primary chemotherapy), or after surgery, known as adjuvant treatment.

It may also be given to people with:

- local recurrence – breast cancer that has come back in the chest/breast area or in the skin near the original site or scar, but has not spread to other parts of the body
- locally advanced breast cancer (also called regional recurrence) – breast cancer that has come back and has spread to the tissues and lymph nodes around the chest, neck and under the breastbone
- secondary (metastatic) breast cancer – breast cancer that has spread to other parts of the body

### **3. Before starting AC chemotherapy**

Before starting your treatment some hospitals will arrange a chemotherapy information session. At this appointment a nurse will discuss how and when your chemotherapy will be given and how side effects can be managed.

You may have bloods tests and some people will have an ECG (electrocardiogram), a simple test that checks your heart rhythm. Your height and weight will also be measured.

Contact numbers will be given so you know who to phone if you have any questions or concerns.

### **4. How does AC chemotherapy work?**

Chemotherapy drugs interfere with how cancer cells develop and grow, and different drugs do this in different ways.

AC chemotherapy works by stopping the cancer cells from dividing and multiplying, which blocks the growth of the cancer.

Different chemotherapy drugs attack cancer cells at different stages of their growth. This is why a combination of drugs is often used instead of a single drug.

AC chemotherapy is a systemic treatment, which means it affects cells throughout the body.

### **5. How is AC chemotherapy given?**

AC chemotherapy is given intravenously (into a vein). This will usually be as an infusion (drip) into the hand or arm, although other intravenous methods may be used depending on factors such as how easy it is for chemotherapy staff to find suitable veins, and your preferences.

Read about the different [ways chemotherapy may be given](#).

You'll normally be given your treatment at hospital as an outpatient or day case, which means you'll be able to go home on the same day.

## How long treatment lasts

You'll usually have four to six cycles (doses) of AC chemotherapy, over three-four months. Both drugs are given on the same day, every three weeks.

The time between each cycle of treatment gives your body time to recover.

This may vary depending on whether the number of blood cells has returned to normal between each cycle.

## 6. Common side effects of AC chemotherapy

Like any treatment, AC chemotherapy can cause side effects. Everyone reacts differently to drugs and some people have more side effects than others. These side effects can usually be managed and those described here will not affect everyone.

If you're concerned about any side effects, regardless of whether they are listed here, talk to your chemotherapy nurse or cancer specialist (oncologist) as soon as possible.

### Effects of giving AC chemotherapy

While the drug cyclophosphamide is being injected, you may feel hot or flushed and slightly dizzy, and have an itchy nose or a metallic taste in your mouth. These feelings usually go away when the injection is finished, but tell your chemotherapy nurse if you experience any of them. Some people find sucking a boiled sweet helps.

### Effects on the blood

AC chemotherapy can [temporarily affect the number of blood cells](#) in the body.

You'll have regular blood tests to check your blood count. If the number of blood cells is too low, your next course of treatment may be delayed or the dose of chemotherapy reduced.

## **Risk of infection**

Not having enough white blood cells can increase the risk of getting an infection.

Contact your hospital immediately if:

- you have a high temperature (over 37.5°C) or low temperature (under 36°C), or whatever your chemotherapy team has advised
- you suddenly feel unwell, even with a normal temperature
- you have any symptoms of an infection, for example a sore throat, a cough, a need to pass urine frequently or feeling cold or shivery

Before starting chemotherapy you should be given a 24-hour contact number or told where to get emergency care by your treatment team. You may need antibiotics. Sometimes your doctor may recommend injections of drugs called growth factors to stimulate the production of white blood cells to reduce your risk of infection.

Having too few red blood cells is called anaemia. If you feel particularly tired, breathless or dizzy, let your treatment team know.

You may also bruise more easily, have nosebleeds or your gums may bleed when you brush your teeth. Tell your treatment team if you have any of these symptoms.

## **Hair loss**

AC chemotherapy causes hair loss in most people. Scalp cooling may be possible to try to prevent or lessen hair loss. It's not available in all areas so ask your specialist or chemotherapy nurse if this is an option for you.

[Read more about hair loss, scalp cooling and looking after your hair »](#)

## **Nausea and vomiting**

You may experience [nausea \(feeling sick\) and vomiting \(being sick\)](#), but many people will not actually be sick. You'll be given anti-sickness medication into your vein or as tablets on the day of treatment, and you'll be prescribed anti-sickness drugs to take home to reduce nausea or vomiting. If you still experience nausea and vomiting, talk to your chemotherapy team.

## **Diarrhoea or constipation**

You may have diarrhoea or constipation but your specialist or GP can prescribe medicine to help control it. Contact your chemotherapy team if you have four or more episodes of diarrhoea within a 24-hour period.

## **Sore mouth and taste changes**

You'll be given mouthwash to try to reduce soreness of the mouth and gums and to try to stop mouth ulcers developing. Good mouth hygiene is very important during treatment. It's advisable to see your dentist for a dental check-up before chemotherapy begins, but avoid dental treatment during chemotherapy.

While you're having AC chemotherapy your taste can change and some food may taste different (for example more salty, bitter or metallic).

[Read our tips on dealing with taste changes during chemotherapy »](#)

## **Pain in the injection site**

If AC chemotherapy leaks out of the vein it's being given in (called extravasation), it can damage the surrounding soft tissue. Tell the nurse giving the chemotherapy immediately if you have pain, stinging or a burning sensation around the cannula (small plastic tube) while the drug is being given.

After treatment, pain can occur where the needle has been inserted or along the vein. After a few weeks you may notice tenderness, darkening and hardening around where the needle was inserted. This should fade in time.

## **Fatigue (extreme tiredness)**

Fatigue is extreme tiredness or exhaustion that doesn't go away with rest or sleep. It's common to have fatigue during your treatment. For some people, fatigue can last for several weeks or even months after the treatment has finished, but your energy levels will gradually return.

There are different ways of [coping with fatigue](#).

## **Bladder irritation and pink or red urine**

Drink plenty of fluids around the time you have your treatment because chemotherapy drugs (particularly cyclophosphamide) can irritate the lining of the bladder. Try to empty your bladder regularly, as soon as you feel the urge. Tell your specialist if you notice any

irritation or a burning/stinging sensation when passing urine.

Doxorubicin can cause your urine to become pink or red for a couple of days. This is because of the colour of the drug, and is completely normal.

## **Effects on your concentration (cognitive impairment)**

Your ability to concentrate or think clearly can also be affected, which can be very frustrating. This is sometimes referred to as 'chemo-brain' or 'chemo-fog' but is more commonly known as cognitive impairment. It usually improves over time after treatment has finished.

## **Effects on fertility**

AC chemotherapy can cause temporary or permanent infertility (being unable to get pregnant). If this is important to you, talk to your specialist before starting your treatment – they may be able to refer you to a fertility specialist. You can read more about this on our fertility web pages.

## **Menopausal symptoms**

Sometimes AC can cause women who haven't been through the menopause (pre-menopausal) to experience menopausal symptoms. This is because it affects the ovaries, which produce oestrogen.

Common symptoms include:

- hot flushes and night sweats
- mood changes
- joint aches and pains
- vaginal dryness

## **7. Less common side effects of AC chemotherapy**

### **Sore eyes and runny nose**

Your eyes may feel sore or gritty. Your eyes may also water. Sometimes eye drops will be prescribed to help.

AC chemotherapy can also cause a blocked or runny nose.

## **Skin reactions**

AC chemotherapy may cause your skin to become red and sore, which can be itchy. You may also develop soreness or redness on the palms of your hands and soles of your feet (called palmar-plantar or hand-foot syndrome). Your doctor may prescribe drugs as gels or creams to apply to the affected areas. It can help to keep your skin moisturised. Let your treatment team know if you notice a skin reaction.

Your skin can become dry and flaky or peel – particularly on your hands and feet – but this will improve after treatment finishes. Using moisturising cream may help.

During treatment with AC and for several months afterwards, your skin will be more sensitive. You'll be more likely to get sunburnt, so wear sunscreen with a high sun protection factor (SPF) if you're out in the sun.

## **Nail changes**

Your fingernails and toenails may become darker and ridges can form. The changes will grow out following the end of your treatment.

## **Heart changes**

Doxorubicin can affect the way your heart works and may not be suitable for people with existing heart conditions.

Heart problems as a result of doxorubicin are not common. However, because they can happen, before you start chemotherapy your specialist may arrange a heart (cardiac) function test to check your heart is working normally.

## **Liver and kidney changes**

AC can affect the kidneys and liver. You'll have regular blood tests to monitor your liver and kidneys throughout your chemotherapy. Any changes are usually mild and get better on their own.

## **8. Blood clots**

People with breast cancer have a higher risk of blood clots. Their risk is higher because of the cancer itself and some treatments for breast cancer. If the cancer has spread to other parts of the body (secondary breast cancer), this also increases the risk.

Having AC chemotherapy increases the risk of blood clots such as a deep vein thrombosis (DVT). People with a DVT are at risk of developing a pulmonary embolism. This is when part of the blood clot breaks away and travels to the lung.

Blood clots can be harmful but are treatable so it's important to report symptoms as soon as possible.

If you experience any of the following symptoms contact your local A&E department, GP or treatment team straight away:

- pain, redness/discolouration, heat and swelling of the calf, leg or thigh
- swelling, redness or tenderness where a central line is inserted to give chemotherapy, for example in the arm, chest area or up into the neck
- shortness of breath
- tightness in the chest
- unexplained cough (may cough up blood)

[Find out more about blood clots »](#)

## **9. Sex, contraception and pregnancy**

It's not known if chemotherapy drugs can pass through vaginal fluids (or semen). Most hospital specialists advise using a barrier method of contraception, such as a condom, for a few days after chemotherapy is given.

Having AC chemotherapy while pregnant may be harmful to a developing baby. Some women can still become pregnant even if their periods are irregular or have stopped. Use a non-hormonal contraception to avoid getting pregnant such as a condom, Femidom or diaphragm. It may also be possible to use a coil (IUD or intrauterine device). However, you would need to discuss this with your specialist as not all types may be suitable for women with breast cancer.

[Read more about contraception during and after breast cancer treatment »](#)

## **10. Vaccinations**

You shouldn't have any live vaccines while you're having chemotherapy. Live vaccines include measles, rubella (German measles), polio, BCG (tuberculosis), shingles and yellow fever.

Live vaccines contain a small amount of live virus or bacteria. If you have a weakened immune system, which you may do during chemotherapy, they could be harmful.

It's safe to have these vaccines six months after your chemotherapy finishes. Talk to your GP or specialist before having any vaccinations.

If someone you live with needs to have a live vaccine speak to your specialist or GP. They can advise what precautions you may need to take depending on the vaccination.

## Flu vaccination

Anyone at risk of a weakened immune system, and therefore more likely to get an infection, should have the flu vaccine. This includes people due to have or already having chemotherapy. The flu vaccine is not a live vaccine so doesn't contain any active viruses. If you're already having chemotherapy, talk to your chemotherapy team or breast care nurse about the best time to have your flu jab.

## 11. Further support

Your chemotherapy team and breast care nurse can help with any questions you have. You can also call our free [Helpline](#) on 0808 800 6000 for information and support.

On our online Forum, you can find people going through treatment at the same time as you on the [monthly chemotherapy threads](#).

You can also speak to someone who has had chemotherapy through our [Someone Like Me](#) service.

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