EC chemotherapy

1. What is EC chemotherapy?
EC is a combination of two chemotherapy drugs used to treat breast cancer. It takes its name from the initials of these drugs:

- epirubicin
- cyclophosphamide

Before starting your treatment some hospitals will arrange a chemotherapy information session. A chemotherapy nurse will discuss how and when your chemotherapy will be given and how side effects can be managed. Contact numbers will also be given so you know who to phone if you have any questions or concerns.

2. Who might be offered EC chemotherapy?
EC chemotherapy can be used to treat primary breast cancer – breast cancer that hasn’t spread beyond the breast or lymph nodes (glands) under the arm. Chemotherapy is given to reduce the risk of breast cancer returning or spreading.

EC 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 breast cancer – breast cancer that has spread to other parts of the body

3. How does EC chemotherapy work?

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

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

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

4. How is EC chemotherapy given?

EC is usually given as a drip into a vein (intravenously) in the hand or arm, although there are other ways of giving it 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 usually have your chemotherapy as an outpatient so you’ll be able to go home the same day.

How long treatment lasts
You'll usually have four to six cycles (doses) of EC chemotherapy, over 3-4 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.

If EC is given for four cycles, it may be followed by another chemotherapy drug such as docetaxel or paclitaxel.

5. Common side effects of EC chemotherapy

Like any treatment, EC 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 EC chemotherapy

If epirubicin leaks out of the vein, it can damage the surrounding soft tissue (called extravastion). Tell the chemotherapy nurse immediately if you experience pain, stinging or a burning sensation near the cannula (small plastic tube) while the drug is being given.

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

EC chemotherapy can temporarily affect the number of healthy 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.

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

Contact your hospital immediately if at any time:

- 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 and/or shivery

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

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

**Hair loss**

EC chemotherapy causes total 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 available and suitable for you.

You can read more about hair loss, scalp cooling and looking after your hair in our Breast cancer and hair loss booklet.

**Nausea and vomiting**

You may experience nausea and vomiting, but many people will not actually be sick. You'll be given anti-sickness medication into your vein during treatment, and you'll be prescribed anti-sickness drugs to take home to reduce nausea or stop it happening.

**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.

Epirubicin 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.

**Sore eyes and nasal congestion**

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

EC chemotherapy can also cause a blocked or runny nose. Tell your nurse if this happens while your chemotherapy is being given.

**Tiredness (fatigue)**
It’s common to feel extremely tired during your treatment. For some people, fatigue can last for several weeks or even months after the treatment has finished, but your energy levels should gradually return.

There are different ways of coping with fatigue.

**Effects on fertility**

EC 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 EC 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 can include:

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

**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.

**6. Less common side effects of EC chemotherapy**

**Heart changes**

Epirubicin can affect the way your heart works and may not be suitable for people with existing heart conditions.
Heart problems as a result of epirubicin 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.

**Skin reactions**

Epirubicin may cause your skin to become red and sore, especially if you've had radiotherapy recently. Let your specialist team know if this happens.

Your skin may darken due to extra pigment (colour) being produced. Any darkening usually returns to normal a few months after the treatment ends.

During EC chemotherapy treatment, 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 (SPF) if you’re out in the sun.

7. **Sex and contraception**

You can still have sex during treatment. It's not known if chemotherapy drugs can pass into vaginal fluids (or semen). Most hospital specialists advise using barrier methods of contraception, such as condoms, for a few days after chemotherapy is given.

Having EC 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, so effective barrier contraception such as a condom should be used.

8. **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 prone to 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 specialist or breast care nurse about the best time to have your flu jab.

9. **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 EC 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 specialist team straight away:

- pain, redness/dischouration, 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)