

## Fludarabine, cyclophosphamide and rituximab (FC-R) chemotherapy for chronic leukaemias and non-Hodgkin lymphomas

Your doctors have suggested that you are likely to benefit from a course of FC-R chemotherapy treatment. They have weighed the expected benefits in terms of controlling the cancer and its symptoms, against the possibility of side effects. Your doctor or nurse will have discussed these with you.

The aim of this treatment is to shrink the cancer. It is not possible to predict before you start treatment how your cancer will respond and if the response will be permanent. This factsheet explains what you can expect from the chemotherapy you will receive.

FC-R is a combination of three drugs. They are fludarabine, cyclophosphamide and rituximab. This chemotherapy is taken by mouth in tablet form. Rituximab is a monoclonal antibody which is given by intravenous infusion.

### Monoclonal antibodies

Rituximab is an antibody used to try to destroy some types of cancer cells while causing little harm to normal cells. The antibody recognises a certain protein that is found on the surface of particular cancer cells. The antibody 'locks on' to the protein (like a key in a lock). This process may trigger the body's immune system to attack the cancer cells. Rituximab attacks both abnormal (malignant) and normal B-cell lymphocytes. The body quickly replaces any normal white blood cells which may be damaged, so the risk of side effects from this treatment is small.

### Treatment plan

- **Fludarabine** – taken as a tablet once a day for five days.
- **Cyclophosphamide** – taken as a tablet once a day for five days.
- **Rituximab** – given as an intravenous infusion (over a period of between 90 minutes and four hours) on day one as an outpatient. You may have this over two days depending on your blood test results.

Days six to 28 are a rest period. Each four week period is called a cycle.

The treatment is usually given over a period of four to six months. We will assess your response to the treatment regularly using CT scans, blood and possibly bone marrow tests. Your doctor will discuss with you, the number of cycles you are likely to have.



A new cannula will be placed in your arm before each dose of rituximab and will remain there only while it is being given. The doctors in clinic will see you and have your blood tested before each cycle of chemotherapy. Treatment may be delayed if your blood count is not at a suitable level.

This factsheet should be read together with The Royal Marsden booklet *Chemotherapy your questions answered*. The booklet offers general information about chemotherapy and details about many of these side effects and how to manage them.

## Side effects

All drugs can have some side effects and this includes R-FC chemotherapy. These vary and for some people they may not occur.

### The more common side effects are:

- **Low blood count** – chemotherapy temporarily reduces the rate at which blood cells are produced in your bone marrow. This may cause:
  - Anaemia (low red cell count) – you may need blood transfusions.
  - Neutropenia (low white cell count) – this may increase your risk of developing an infection, which may be serious and life threatening.
  - Thrombocytopenia (low platelet count), which may increase your tendency to bleeding – you may need platelet transfusions.

**If you feel unwell at any time *or* have a temperature (37.5°C/99.5°F or higher or 35.5 °C/95.9 °F or lower) you should contact the hospital immediately** as you may need to be admitted for intravenous antibiotics. For further information please refer to The Royal Marsden booklet *Chemotherapy your questions answered*.

- **Nausea and vomiting** – chemotherapy sometimes causes this. It can usually be managed with anti-sickness (anti-emetic) drugs.
- **A decreased appetite** – during your treatment, you may find that you lose your appetite.
- **Diarrhoea** – this can be treated with medications that slow the bowel.
- **Hair loss** (alopecia) – temporary hair loss may happen but hair usually thins rather than falls out completely. For further information please refer to the Macmillan booklet *Coping with hair loss*.
- **Tiredness or lethargy** – during your chemotherapy, you may become very tired. Pace yourself and rest as necessary.
- **Sore mouth** – keep your mouth clean and healthy by drinking plenty of fluids and carrying out good oral hygiene. You will be given prescribed mouthwashes to help with this.
- **Effects on the bladder** – cyclophosphamide can cause irritation to the bladder. Drinking plenty of fluids will help prevent this. However, if you notice blood in your urine, please inform your doctor or nurse.
- **Skin and nail changes** – your skin may also become darker, redder and more sensitive to light. You will need to take care in the sun as your skin may burn more easily during treatment and for several months afterwards. Your nails may become darker than usual and they may develop ridges. White lines may appear on them. These changes usually grow out over a few months after the treatment has finished.



- **Numbness and tingling in the hands and feet** (peripheral neuropathy) – the chemotherapy drugs can cause problems with the nerves in the body. It can cause sensations like tingling, burning, numbness or pins and needles in the hands and/or the feet. Tell your doctor if you get any of these sensations, so they can be monitored. Most of the time, these symptoms will get better after your treatment ends, although it may take some time.

### Side effects of rituximab

The following side effects may also happen with the rituximab part of your treatment.

- **Flu-like symptoms** – this can include a high temperature and chills, muscle aches and headache. This can occur while the infusion is in progress but should not last for long. This is due to the reaction of your body to a foreign antibody. If these symptoms occur, the infusion may need to be stopped and restarted when the symptoms have resolved. Any lingering effects should disappear once your treatment is completed. If, however, you experience any of these symptoms or feel unwell at home following the infusion, please contact your nurse or clinic as soon as possible.
- **Low blood pressure** – this may happen during the infusion. Your blood pressure will be checked regularly.
- **Allergic reactions** – for a small number of patients, a more severe, occasionally life-threatening, infusion related reaction can happen. In addition to the side effects above, this may include a feeling of swelling in the tongue or throat, a cough and breathlessness. You will be monitored closely during your treatment and if any of these symptoms occur the treatment will be slowed down until you are feeling better.

### Less common side effects are:

- **Lung damage** – cyclophosphamide can cause changes to the lungs. Tell your doctor if you have any changes with your breathing or a cough.
- **Changes in liver function** – there may be changes in the way your liver works. You will be monitored closely during treatment. These are usually temporary effects and are unlikely to cause you any symptoms.
- **Secondary cancer** – there is a small chance that cyclophosphamide may cause a secondary cancer. If this is of concern, please feel free to discuss with your doctor.

### Fertility, pregnancy and breastfeeding

- **Fertility** – chemotherapy can damage the testis or ovary. This may affect your ability to conceive (or father a child). Infertility can be temporary or permanent. Sometimes, in women, chemotherapy can lead to premature menopause. If relevant to you, you may want to discuss the issue of fertility with your doctor before treatment is started.
- **Pregnancy** – during chemotherapy and for up to a year afterwards, if sperm or eggs are produced they may be abnormal. Treatment can also harm an unborn child. We recommend that you or your partner use a barrier method of contraception (such as condoms), during treatment and for one year afterwards. If you know you are pregnant before starting treatment or become pregnant during treatment, you must tell your doctor immediately.
- **Breastfeeding** – there is a risk of harm to a child who is being breastfed since the drug may be concentrated in the milk. It is very important that women do not breastfeed while receiving chemotherapy.



## Blood clots

Both the lymphoma and the chemotherapy can increase the risk of developing blood clots. Blood clots can occur in the veins causing problems like deep vein thrombosis (clot in the leg causing swelling of the leg) or pulmonary embolus (clot in the lung causing shortness of breath or chest pain). Blood clots can also occur in the arteries leading to a heart attack, stroke or impairment of the blood supply to a limb. Blood clots can be life threatening but can usually be treated by drugs that thin the blood. If you are concerned about any of the above, please inform your doctor immediately.

## Blood transfusions

Fludarabine can cause any red blood cells given by a donor to react against your own. If you need a blood transfusion during and after taking fludarabine, it is important that the blood is irradiated. You will be given an information leaflet about this called information for patients requiring irradiated blood.

We have listed the most common side effects of this chemotherapy. You may experience some or several of these side effects listed above and they may be mild, moderate or severe. Some can occasionally be life-threatening.

As with all drugs, there may be other side effects not mentioned here that you may experience. Because of the risk of side effects, it is important that you:

- **Always** tell your doctor if you suffer from any of these side effects, or if you have experienced any new symptoms since you last visit. Your doctor can help you by giving you medication or advice, to reduce or stop these side effects from occurring in the future.
- **Always** tell your doctor about any other medicine you are taking or planning to take, including herbal and complementary therapies.
- **Always** consult your doctor before having any other procedure, for example, dental work or vaccinations.

## Contact details

Please contact your Clinical Nurse Specialist if you have any concerns or queries.

Sutton: 020 8661 3987  
Chelsea: 020 7808 2247

Alternatively, please call:

**The Royal Marsden Macmillan Hotline:** 020 8915 6899  
(available 24 hours a day, 7 days a week)

