Patient information

R-GEM-P chemotherapy for Hodgkin or non-Hodgkin lymphoma

Your doctors have suggested that you may benefit from a course of R-GEM-P chemotherapy treatment. They will have weighed the potential benefits of treatment, in terms of controlling the cancer and its symptoms, against the possibilities of side effects. Your doctor 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 information sheet explains what you can expect from the chemotherapy you will receive. You can ask a member of the medical team if any of the information you have received is unclear.

Treatment plan

R-GEM-P chemotherapy is a combination of four drugs. They are rituximab, gemcitabine, cisplatin and methylprednisolone. Your R-GEM-P chemotherapy will be given as a cycle over 28 days as follows:

- Rituximab is given as an intravenous infusion (drip) into a vein. This is given on days one and 15.
- Gemcitabine is given as an intravenous infusion (drip) into a vein (usually on the hand or forearm) over 30 minutes. This is given weekly on days one, eight and 15.
- Cisplatin will also be given as an infusion into your vein on day 15 over four hours with bags of intravenous fluid given both before and after the cisplatin. This is to help protect your kidneys. The infusions of cisplatin and fluid are given as an inpatient and will be repeated every four weeks.
- Methylprednisolone is given to you as either an infusion into a vein or as tablets on day one and as tablets to take at home days two to five.

Days 16 to 28 are a rest period. Each four week period is called a cycle.

You will receive day one and eight of this treatment as an outpatient and day 15 of treatment is given as an inpatient over one night.

The treatment is usually given over a period of two to four months. Your doctor will discuss with you the number of cycles you are likely to have.

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A new cannula will be placed in your arm before each dose of chemotherapy and will remain there only while that chemotherapy is being given. Some people may have their treatment given through a central venous access device (see The Royal Marsden booklet *Central venous access devices* for further information).

The doctors in clinic will see you and test your blood before each cycle of chemotherapy. Treatment may be delayed if your blood count is not at a suitable level.

Monoclonal antibodies

Rituximab is an antibody that recognizes a certain protein called CD20 that is found on the surface of white blood cells called B Lymphocytes. CD20 is found on both normal B Lymphocytes and abnormal (malignant) B 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 cells. Rituximab attacks both abnormal (malignant) and normal B-cell lymphocytes. The body replaces any normal white blood cells which may be damaged, so the risk of side effects from this treatment is small.

Rituximab is used to treat many different types of B cell Lymphoma's or Lymphoid malignancies that have the CD20 protein. It is used to treat no –malignant conditions such as EBV (Epstein Barr Virus).

Rituximab is given in a day setting; is given as an infusion (drip) into your vein through a cannula (fine tube). Some people can have an allergic reaction to this treatment and to reduce the risk of this the first dose is given slowly over a number of hours. You will be given steroids, antihistamines and paracetamol before the treatment begins to reduce the effects of any reaction. Further doses can be given over one and a half to two hours if there are no complications with the first infusion. Your doctor or nurse will discuss with you the number and frequency of infusions you are likely to have.

This information sheet should be read together with the booklet *Chemotherapy; your questions answered*. This booklet offers general information about chemotherapy and details many of the side effects and how to manage them. If you have not yet received this booklet, please ask for it along with any others mentioned in this information sheet.

Side effects of Rituximab

All drugs can have side effects and this is true of Rituximab. Potential side effects you may experience are as follows:

- Allergic reactions – These 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. You will be closely monitored for the following symptoms and you should report them immediately if they occur:
    - Flu like symptoms, fever, chills, headache, dizziness
    - Feeling breathless or wheezy
    - Feeling sick (nauseas)
    - Development of a rash or itchy skin
    - Feeling of swelling in the tongue, throat or lips
    - Tightness or pain in the chest.

The infusion may need to be stopped and then restarted once the symptoms have gone. Any lingering effects should disappear once treatment is completed. If however, you experience any of these symptoms or feel unwell at home following the infusion, please contact your nurse as soon as possible.

- Low blood pressure – this may happen during the infusion. Your blood pressure will be checked regularly. If you normally take any medication to lower your blood pressure, please tell your doctor or nurse.
- Nausea and vomiting – Rituximab can sometimes cause this. It can usually be managed with anti-sickness (anti-emetic) drugs. For further information please visit Macmillan Cancer Support at www.macmillan.org.uk

Later side effects

Risk of infection – Rituximab can reduce the number of normal white blood cells, particularly B lymphocytes. These cells are responsible for fighting infections particularly viruses, so you may be more prone to colds. It can also lower your immunity by reducing the levels of one antibody in your blood called IgG; this can further increase your risk of infection. If your IgG level is found to be low and you have frequent infections, you may require immunoglobulin infusions or low dose antibiotics. If you feel unwell at home, please contact your nurse as soon as possible.

Rare side effects

- Thrombocytopenia – Low platelet count which may increase your tendency to bleeding and you may need platelet transfusions.
- Low red cell count – Anaemia; you may require a blood transfusion
- Neutropenia – Low white blood count; this may increase your risk of infection
- Reactivation of hepatitis infection - If you have ever had hepatitis in the past, this can be reactivated following Rituximab infusions. For this reason we test all patients receiving this treatment for Hepatitis B and C.
- Progressive Multifocal Leukoencephalopathy (PML) – This is a rare side effect causing serious brain infection. If you notice any of the following side effects, you must report and tell your medical team immediately:
    - Memory loss, confusion or difficulty thinking
    - Loss of balance, weakness in one side of the body or difficulty walking
    - Changes in speech
    - Loss of vision
- Heart problem –You must inform your doctor or nurse if you are known to have heart problems. In some patients, irregular heartbeats or chest pain may occur, particularly in those known to have these conditions already.

Side effects of GEM-P chemotherapy

All drugs can have some side effects and this includes GEM-P 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 feel tired and breathless. You may need blood transfusions.
    - Neutropenia (low white cell count) – R-GEM-P chemotherapy can reduce the production of white blood cells and this may increase your risk of developing an infection which may become serious and life-threatening.
    - Thrombocytopenia - increased tendency to bleed.
    - R-GEM-P chemotherapy can reduce the production of platelets which are necessary for clotting. Please inform the doctor if you have any unexplained bruising or bleeding. You may need a platelet transfusion.

If you feel unwell at any time or have a temperature (37.5ºC/99.5ºF or higher or 35.5 ºC/95.9 ºF 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. For further information please visit Macmillan Cancer Support at www.macmillan.org.uk

- Flu-like symptoms (fever, headaches, pain) – this can occur while the rituximab infusion is in progress but should not last for long. 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.

- Damage to the kidneys – cisplatin may affect your kidneys. This is generally mild and unlikely to cause you any symptoms, but rarely the kidneys may be permanently damaged. You will have a kidney test called an EDTA in the Nuclear Medicine Department before you start your treatment to ensure your kidneys are working correctly. Your doctor will discuss this test with you. Your kidney function will be checked by a blood test before each treatment and the cisplatin will be stopped if the blood test shows any signs of damage.

- Changes in the way your liver works - the drugs (especially gemcitabine) can affect the function of your liver. Patients with inadequate liver function may not be able to have this drug. You will have a blood test to check how well your liver is functioning before each session of treatment.

- Tiredness and lethargy - during your chemotherapy, you may become tired more easily after normal activities. This is quite normal and usually occurs with all types of chemotherapy. Your tiredness should resolve in time.

- Effects on sensation (peripheral neuropathy) – a feeling of tingling (pins and needles) or loss of feeling (numbness) in the hands and feet. You may also notice that you have difficulty doing up buttons or similar fiddly tasks. Tell your hospital doctor if you notice any numbness or tingling in your hands or feet. If you develop persistent changes then the cisplatin may need to be stopped. This will usually resolve over a few months once the cisplatin is stopped but can be permanent.

- Hair loss – does not usually occur with this chemotherapy, although a few people have reported some hair thinning. Hair grows back once chemotherapy is stopped.

- Effects on hearing – you may develop ringing in your ears (tinnitus) and your hearing can be affected, especially of high-pitched sounds. This usually improves once the cisplatin is stopped although it can be permanent. Please inform the doctor if you notice any hearing loss or tinnitus.
- Allergic reaction – can be associated with skin rash, itching and fever, shivering, headache, dizziness or redness of face. You will be monitored during the infusion. Tell the doctor if you experience any symptoms.
- Taste changes – you may find taste changes affect your appetite. However, it is important to make sure you drink plenty of fluids, at least 10 glasses or cups a day, and eat well.
- Skin rashes – some may be very itchy, but they are usually mild. Medications can be given to help if the rash is itchy.
- Headaches – If you have a headache for more than 24 hours you must inform your doctor or Clinical Nurse Specialist.

Less common side effects are:

- Sore mouth and mouth ulcers – keep your mouth clean and healthy by drinking plenty of fluids and carrying out good oral hygiene. If you develop a sore mouth, we can prescribe mouthwash to help with this.
- Constipation or diarrhoea – you may experience either of these. Constipation can be treated with laxatives and diarrhoea can be treated with medications that slow the bowel.
- Scarring on the lungs – this is a rare side effect causing stiffening of the lungs and shortness of breath. If this happens, the chemotherapy would be stopped.
- Heart disturbance – cisplatin may rarely affect the heart rhythm.
- Allergic reaction – for a small number of patients, a more severe, occasionally life-threatening, rituximab 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.
- Other medicines – some medicines, including those you can buy in a shop or chemist, can be harmful to take when you are having chemotherapy. Let your doctor know about any medications you are taking, including non-prescribed drugs such as complementary therapies and herbal drugs.

Side effects of steroids

As methylpredisolone is a steroid, there are a number of side effects you may experience when taking this. Most of these will go away once treatment is finished. Other than those mentioned above, you may notice the following:

- Fluid retention – you may notice swelling of your ankles (ankle oedema). Usually, this is mild and goes away when treatment ends.
- Mood changes, euphoria or difficulty in sleeping. You may find it helpful to discuss with your doctor which time of day is best to take your steroids. It is usually best to avoid taking them in the evening, if possible.

- Blurred vision – tell your doctor if this happens.
- Irritation of the lining of the stomach – methylprednisolone may cause stomach pain, however you will be given drugs to prevent this from happening. It may also cause increased appetite and weight gain.
- Steroid induced diabetes – this may be permanent.

With certain side effects, a treatment break or dose reduction may be necessary. If you have any concerns regarding these side effects, you can contact the hospital (see contact details on page 7).

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

Some cancers increase the risk of developing blood clots. Chemotherapy drugs can also cause an increase in the risk of patients developing blood clots whilst they are on treatment. The most common place for blood clots to form is in the calf. This is called a deep vein thrombosis (DVT) and causes the leg to swell. If a part of the clot breaks free, it may travel to the lungs, causing shortness of breath or chest pain. This is called a pulmonary embolus (PE). Blood clots can be life threatening and treatment with blood-thinning drugs (anti-coagulants) is usually given to help ‘dissolve’ the clot and prevent further problems. Please inform your doctor immediately if you are worried you may have a blood clot.

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 your 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: (available 24 hours a day, 7 days a week)	020 8915 6899