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# Autologous Stem Cell Transplants

A Guide for  
Patients

**Leukaemia Care**  
YOUR Blood Cancer Charity

# Introduction

**A stem cell transplant is a procedure which involves replacing your faulty or damaged bone marrow cells. Autologous means that you do not need a donor and the stem cells are your own. This booklet helps you to understand this treatment a little better.**

Booklet written by Dr. Oscar Berlanga, and reviewed by Christine Lim, Post Bone Marrow Transplant CNS at King's College Hospital, our Nurse Advisor Fiona Heath and Jonathan Kay, Patient Information Writer and Researcher at Anthony Nolan. Thank you to our patient reviewers John Watson and Paul Cabban for providing valuable feedback.

If you need specific advice or are concerned about anything regarding stem cell transplants, please contact your medical team or Clinical Nurse Specialist (CNS).

If you would like any information on the sources used for this booklet, please email [communications@leukaemiacare.org.uk](mailto:communications@leukaemiacare.org.uk) for a list of references.

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# About Leukaemia Care

**Leukaemia Care is a national charity dedicated to ensuring that people affected by blood cancer have access to the right information, advice and support.**

## Our services

### Helpline

Our helpline is available 9.00am - 10.00pm on weekdays and 9.00am - 12.30pm on Saturdays. If you need someone to talk to, call **08088 010 444**

### Nurse service

We have two trained nurses on hand to answer your questions and offer advice and support, whether it be through emailing **nurse@leukaemicare.org.uk**, over the phone on **08088 010 444** or via LiveChat.

### Patient Information Booklets

We have a number of patient information booklets like this available to anyone who has been affected by a blood cancer. A full list of titles – both disease specific and general information titles – can be found on our

website at **www.leukaemicare.org.uk/resources/filter-by-resource-type/information-booklets**

### Support Groups

Our nationwide support groups are a chance to meet and talk to other people who are going through a similar experience. For more information about a support group local to your area, go to **www.leukaemicare.org.uk/our-support-groups**

### Buddy Support

We offer one-to-one phone support with volunteers who have had blood cancer themselves or been affected by it in some way. You can speak to someone who knows what you are going through. For more information on how to get a buddy call **08088 010 444** or email **support@leukaemicare.org.uk**

### Online Forum

Our online forum, [www.healthunlocked.com/leukaemia-care](http://www.healthunlocked.com/leukaemia-care), is a place for people to ask questions anonymously or to join in the discussion with other people in a similar situation.

### Patient and carer conferences

Our nationwide conferences provide an opportunity to ask questions and listen to patient speakers and medical professionals who can provide valuable information and support.

### Website

You can access up-to-date information on our website, [www.leukaemicare.org.uk](http://www.leukaemicare.org.uk), as well as speak to one of our care advisers on our online support service, LiveChat (9am-5pm weekdays).

### Campaigning and Advocacy

Leukaemia Care is involved in campaigning for patient well-being, NHS funding and drug and treatment availability. If you would like an update on any of the work we are currently doing or want to know how to get involved, email [advocacy@leukaemicare.org.uk](mailto:advocacy@leukaemicare.org.uk)

### Patient magazine

Our free quarterly magazine includes inspirational patient and carer stories as well as informative articles by medical professionals. To subscribe go to [www.leukaemicare.org.uk/resources/subscribe-to-journey-magazine](http://www.leukaemicare.org.uk/resources/subscribe-to-journey-magazine)

# What are stem cells?

**Stem cells are blood-forming cells that reside in your bone marrow, the soft tissue inside the bones.**

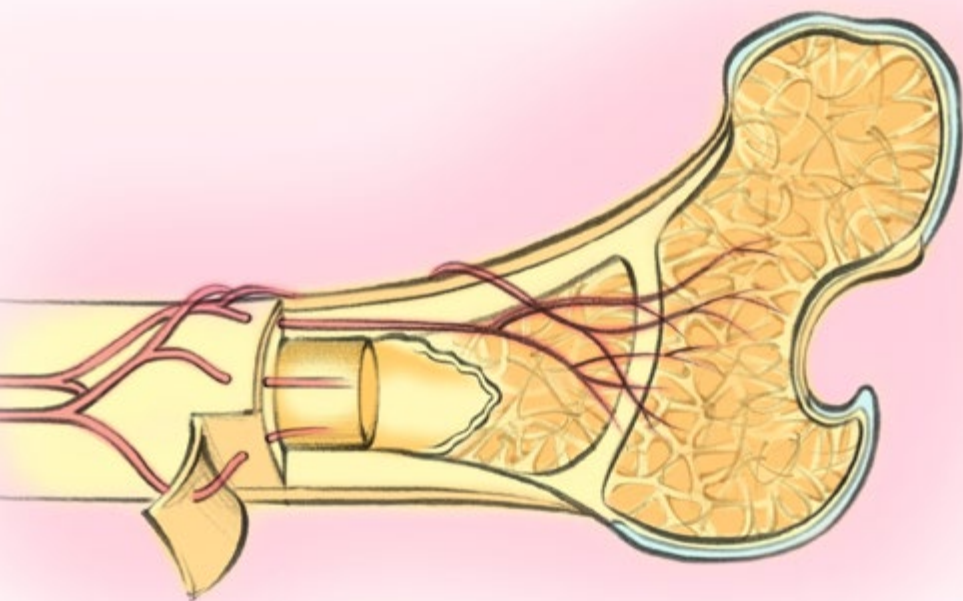
Stem cells can mature to become one of three types of blood cell:

- Leukocytes (white blood cells), which fight infection;
- Red blood cells, which carry oxygen;
- Platelets, which help the blood to clot.

Stem cells also have the ability to self-replicate into identical copies; these cells are therefore preserved throughout life to assure a constant supply of blood cells.

The process of the development and maturation of stem cells is known as haematopoiesis. Every day, haematopoietic stem cells produce billions of new blood cells. If haematopoietic stem cells are unable to perform this function, medical intervention will be required straight away.

Haematopoietic stem cells are found in the bone marrow, peripheral blood and the umbilical cord. Cells from any of these sources can be used for transplantation.



# What are Haematopoietic Stem Cell Transplants?

**Haematopoietic Stem cell transplantation (HSCT) is a medical procedure used to replace your faulty or damaged bone marrow cells for healthy ones from a donor.**

HSCT is a common approach nowadays for treating blood conditions, including non-malignant and malignant diseases:

- Non-malignant diseases, in which your bone marrow cannot produce blood cells, or the cells produced are defective. This often causes abnormally low or high numbers of blood cells (leukocyte, red blood cell or platelet) in the circulation.
- Malignant (neoplastic) diseases, which include blood cancers such as leukaemia, lymphoma or multiple myeloma.

If you are diagnosed with a blood cancer or some other

blood disorder, your blood cell production may be impaired, resulting in over or underproduction of blood cells. As a consequence, your system may no longer be able to perform some of its functions, such as fighting infection or transporting oxygen to organs and tissues.

Haematopoietic stem cell transplants are performed to control or cure some of these diseases.

Depending on the donor, there are two general types of stem cell transplants:

- 1. Autologous, also known as auto transplant** - If you are having an autologous stem



cell transplant it means that you donate your own stem cells before receiving high-dose therapy. These cells are administered back to you afterwards to rescue your bone marrow.

- 2. Allogeneic** - In this case, you receive stem cells from a healthy donor.

The booklet talks about autologous stem cell transplants. If you would like more information about allogeneic stem cell transplants, please request a copy of our other stem cell booklet from the patient services team at **08088 010 444** or email **[support@leukaemiacare.org.uk](mailto:support@leukaemiacare.org.uk)**

# Who receives a stem cell transplant?

Some non-malignant blood diseases can be treated with the use of drugs that help control the excessive activity of the immune system responsible for the disease.

On the contrary, neoplastic blood diseases (blood cancers) often require chemotherapy, with or without radiotherapy.

In some patients chemotherapy will be sufficient to control the disease. In other cases, chemotherapy is not enough; and a stem cell transplant (autologous or allogeneic) is required.

If you have been diagnosed with a blood disorder, your doctor will explain the different treatment options with you, and decide which treatment intervention is

appropriate depending on your condition, and the availability and source of stem cells.

Autologous haematopoietic stem cell transplants (HSCT) are indicated in all those diseases that require intensive chemotherapy.

This is the case of:

- Hodgkin's disease and non-Hodgkin lymphoma
- Some solid tumors

These are a good option to help control the diseases in the first instance, especially if the patient is likely to experience complications. However further treatment may be needed at a later date.

Autologous stem cell transplants are used in the treatment of diseases such as:

- Multiple myeloma
- Amyloidosis
- Certain autoimmune diseases

In all cases, the indication for one type of transplant or other transplantation should be individualised. Your doctor will evaluate both your disease and the possible risks and benefits of Haematopoietic stem cell transplant and other therapeutic measures.

If you have any questions or concerns about stem cell transplants, you can speak to one of our nurses or helpline volunteers on **08088 010 444**. The helpline is open weekdays 9:00am - 10:00pm and Saturdays 9:00am - 12:30pm.

# Autologous stem cell transplants

Type of transplant	Aim of transplantation	Advantages	Disadvantages
Autologous	Rescue bone marrow function after high-dose therapy	Lower risk of post-transplant complications	Greater chance of relapse
Allogeneic	Replace damaged cells in bone marrow for healthy ones, combining the effects of chemotherapy and donor cells to destroy residual malignant cells	Lower risk of relapse	Greater risk of post-transplant complications

Autologous stem cell transplants aim to eliminate neoplastic cells from your body using high doses of chemotherapy, sometimes combined with radiotherapy, and to recover the bone marrow function as soon as possible afterwards using your own stem cells.

For the treatment of some diseases, the intensity of chemotherapy required for killing the cancer cells is so high that it can impact on other parts of the body. This is because the treatment destroys

both the cells that cause the disease and also the normal, healthy cells in the bone marrow (this is called myeloablation).

The simplest way to resolve this toxicity is to receive a transplant with your own, healthy stem cells, in order to rescue your bone marrow (this is called haematopoietic or stem cell rescue). These stem cells are collected and stored before your chemotherapy begins.

Whilst this procedure makes it possible to cure some lymphomas,

or make diseases such as multiple myeloma less likely to come back after therapy, it does not allow the curing of leukaemias or non-neoplastic congenital blood diseases. In these cases, it is necessary to associate intensive treatment with a stem cell transplant from a healthy donor (allogeneic transplantation).

For some blood cancers, particularly multiple myeloma, a relatively recent method used for autologous stem cell transplantation has been investigated, known as "tandem transplantation". During tandem transplantation the patient receives two consecutive courses of high-dose chemotherapy, each followed by a stem cell transplant. The second course of chemotherapy generally takes place several weeks or months after the first one. Although promising, tandem transplants are not routinely offered at present in the UK.

# How to prepare for a stem cell transplant

Haematopoietic stem cell transplant is a complex and long procedure involving different phases, before and after the transplant. Generally speaking, there are five stages:

- 1. Tests and examinations** - To assess your general level of health and fitness.
- 2. Harvesting** - The process of obtaining the stem cells for the transplant; if you are having an auto transplant these will be your own.
- 3. Conditioning** - The treatment that you receive to prepare your body for the transplant.
- 4. Transplanting the stem cells**
- 5. Recovery** - You must stay in hospital for at least a few weeks after the transplant.

## Stage 1: Tests and examinations

Before you have a stem cell transplant your medical team needs to perform some tests

to ensure you are fit enough to undergo the process. This usually takes a couple of days, and the tests might include:

- **X-ray and/or computerised tomography (CT) scan** - These are imaging techniques to check the condition of your organs such as the lungs and liver.
- **Blood tests** - To check your blood cell counts and the levels of a number of biomarkers indicative of liver and kidney function.
- **Electrocardiogram (and, occasionally, echocardiogram)** - An electrocardiogram is a simple test to check your heart's rhythm and electrical activity using sensors attached to your skin. An echocardiogram is a scan to look at your heart and nearby blood vessels.
- **Dental checkup** - Any decaying tooth can potentially be a source of infection during your transplant, so it is important to

have them checked.

- **Respiratory, gynaecologic and other tests** - You may also have these tests among any others that your doctor may consider necessary depending on your type of transplant and individual characteristics.

If you have a blood cancer (e.g. leukaemia or multiple myeloma) your doctor will perform a bone marrow biopsy, where a small sample of cells is removed from the hip for analysis.

## Stage 2: Harvesting stem cells

If you are having an autologous haematopoietic stem cell transplant, your own stem cells will be collected, stored and frozen, before you receive your high-dose chemotherapy (conditioning treatment). These cells are transplanted back in to your body after killing the cancerous cells with high-dose chemotherapy.

Stem cells can be harvested from peripheral blood or from the bone marrow. Alternatively, stem cells can also be obtained from umbilical cord blood.

### Collecting stem cells from blood

Nowadays, stem cells from the peripheral blood, rather than from the bone marrow, is the most common source for transplantation. This involves taking blood and separating out the stem cells. To boost the number of stem cells in the blood, you are given a subcutaneous injection, called Granulocyte-Colony-Stimulating-Factor (GCSF) for a few days (the number of days depends on the regime you are on) to stimulate the production of stem cells. On the day of the peripheral blood stem cell collection, a blood test is carried out to check whether there are enough circulating stem cells in the blood. In order to collect the stem cells, the vein in each arm will be connected by tubes

# How to prepare for a stem cell transplant (cont.)

to a cell-separator machine. Blood is removed from one arm and passed through a filter, before being returned to the body through the other arm. This procedure is not painful and is done while you are awake. It takes around three hours and may need to be repeated the next day if not enough stem cells were obtained the first time.

## Collecting stem cells from bone marrow

An alternative method of collecting donor stem cells is to remove bone marrow from the hip using a needle and syringe. One needle is inserted usually on each side of the hip, to ensure enough bone marrow is obtained. This is done under a general anaesthetic, so no pain is felt while the procedure is carried out. The area where the needle is inserted may be painful afterwards and leave marks on the skin.

## Stage 3: Conditioning treatment

Your conditioning treatment

consists of chemotherapy, with or without radiotherapy, given to eliminate as many diseased cells as possible and to prepare your body for receiving the stem cells that will be transplanted soon after.

The dose of chemotherapy is calculated according to your weight. Generally, the drugs are administered intravenously through a central venous line, a thin tube inserted into a large vein in your chest. This central line stays in place throughout your treatment, making it easier for your medical team to administer drugs.

Conditioning treatment is typically given during the week before your transplant and is given both in autologous and allogeneic transplantation.

The type of conditioning chemotherapy is decided upon your type of disease, age and general health. In few special cases, such as children with severe immunodeficiencies, conditioning treatment may not



be necessary and the stem cell transplant is carried out without previous preparation.

Depending on their intensity, conditioning regimens are classified, from more to less intense, as high-dose (myeloablative), reduced-intensity, and non-myeloablative. Your doctor will discuss with you the best option for your particular case.

### High-dose (myeloablative) conditioning

This was the first type of conditioning treatment developed for bone marrow transplantation. Myeloablative conditioning is used for removing the abnormal cells from your body, to create space in your bone marrow for the new cells and to avoid your immune system rejecting the transplanted cells.

The dose of chemotherapy used in this modality of conditioning treatment is strong enough to kill your bone marrow cells (myeloablation); so you need

a stem cell transplant to recover your ability to generate new blood cells (this is called haematopoietic rescue).

As part of your conditioning treatment you may also need radiation therapy over the whole body (total body irradiation). Radiation is given fractionally over three to six sessions, administered in three to four days. If you are given total body irradiation special measures are taken to protect your lungs from radiation.

### Stage 4: Transplant

Your transplant will usually take place a day or two after conditioning has finished. The stem cells are infused slowly into your body through the same central line used for giving you drugs, and the process usually takes between 30 minutes and an hour. The transplant is not painful and you will be awake throughout.

You can find a more detailed description of what happens on transplant day on page 19 of this

# How to prepare for a stem cell transplant (cont.)

booklet.

## Stage 5: Recovery

After the transplant, you may need to stay in hospital for at least a few weeks, until the infused stem cells settle in your bone marrow and start producing new blood cells. Alternatively, some patients may be discharged within a few hours and will be treated as an outpatient every day for assessment.

During this period, you can experience a number of side effects such as vomiting, diarrhoea and loss of appetite and so it is important to try and prevent infection as much as possible. Many patients are treated as outpatients or in wards and have regular red blood cell and platelet transfusions. If you have visitors, they will also need to consider ways to stop infection and prevent you from getting ill. For example, they will need to wash their hands before entering the room.

# What will happen on transplant day?

Your transplant will take place after you have finished your conditioning treatment (within one or two days).

You will be given medication to prevent any allergic reaction during the infusion of cells. Like a blood transfusion, you receive the stem cells intravenously through a central venous line possibly placed in your neck. The procedure takes between 30 minutes and an hour. You will be awake all the time and feel no pain. Your nurse will monitor your blood pressure and temperature during and after your transplant.

The infusion of stem cells is usually well tolerated, but in some cases, especially if the cells have been previously frozen, you may develop fever and chills, nausea and vomiting, dark urine and the perception of an unpleasant odour, which originates from the preservative used.

After entering the bloodstream, the stem cells travel through the circulation and reach your bone marrow, where, after two to three weeks, they begin to produce new

blood cells.

Leukaemia Care offers nationwide support groups for people affected by a diagnosis of a blood or lymphatic cancer. Visit [www.leukaemiacare.org.uk](http://www.leukaemiacare.org.uk), or call **08088 010 444**, to find out more and to find a group near you.

# Side effects

Because the conditioning treatment wipes out the cells in your bone marrow, the first month after the transplant you enter a phase of aplasia characterised by a decrease in the number of blood cells in your body (leukocytes, red blood cells and platelets), which can cause infections, haemorrhages and other complications.

Complications may derive from the intensity of the chemotherapy you are given or they may relate to the stem cell transplant. Many complications are common to all transplants but highly variable between patients. For this reason, it is not possible to anticipate the specific side effects that you might experience, or how intense they may be and for how long they will last. Your doctor will discuss with you potential side effects that may arise in your particular case.

After the transplant, you will be carefully monitored until your transplanted cells start to regenerate, a process where your bone marrow starts to produce enough blood cells to replace those that have been destroyed

by the treatment. If you are in hospital during this time, you may receive visitors but they must be well and will need to wear protective clothing to protect you from getting an infection.

The length of your hospital stay depends on the type of transplant and conditioning treatment you have received, but usually lasts between two and four weeks after your transplant. You may be hospitalised for a longer period until your immune system recovers enough for you to go home, but some patients remain as outpatients during this time.

## Side effects due to the conditioning (pre-transplant) chemotherapy

As expected, the higher the intensity of chemotherapy the more intense and lengthy the side effects. Below are some common early complications that you may experience because of your conditioning treatment:

### Nausea and vomiting

These are the most frequent complications after a stem cell

transplant. Symptoms can start as soon as therapy is initiated and stop with the end of treatment. Current antiemetics (drugs to prevent nausea and vomiting) are very effective, and this side effect is usually tolerated relatively well.

### Oral mucositis

This refers to the inflammation of the mucous membrane of the mouth. It usually appears five to seven days after the end of conditioning treatment, and disappears when the white blood cell counts return to normal levels. It can be painful and prevents an adequate food intake. If your ability for food intake is very limited, you may be given parenteral (intravenous) or enteral (by tube) nutrition.

### Diarrhoea

This is a common side effect but easily managed with appropriate medication. It may start two to three days after initiating conditioning treatment, and usually lasts four to five days. To reduce the risk of infections, you need maximum hygiene of the anal area.

### Parotitis

Inflammation of the parotid (mumps). It may happen if you have received total body irradiation. It usually appears after the first or second session of radiotherapy. The condition is easily countered with mild analgesics.

### Hair loss (alopecia)

Hair loss does not constitute a clinical problem but an aesthetic problem however, losing your hair may have a psychological impact. Hair loss occurs because the chemotherapy attacks the cells in your hair roots. Both men and women can be affected.

Chemotherapy may cause hair loss all over your body – not just on your scalp. Hair can fall out very quickly in clumps or gradually. Some chemotherapy drugs are more likely than others to cause hair loss, and different doses can cause anything from a mere thinning to complete baldness.

If you lose hair as a consequence of your treatment, it will usually grow again three to six months

## Side effects (cont.)

after your transplant, although it is not uncommon that it changes some of its characteristics (more or less curly, more or less fatty, and more or less abundant).

No treatment exists that can guarantee your hair won't fall out during or after chemotherapy, but some treatments have been investigated to prevent hair loss.

For greater comfort and hygiene, you may opt for a good haircut (number 0, 1 or 2) before transplantation.

### Infections, risk of bleeding and anaemia

Chemotherapy and immunosuppressant drugs weaken your immune system, making you vulnerable to infections. Immediately after having a transplant you may stay in a special, sterile room for the first few weeks. Your risk of infections will continue for the following months until your immune system recovers.

Depending on your risk of infection, several preventive

measures may be taken. Over 90% of patients will have fever immediately after the transplant, and should be treated with antibiotics. Anaemia can cause you to feel tired, have palpitations, dizziness on sitting up and headache. To prevent anaemia you will receive as many red blood cell transfusions as necessary, in order to maintain your red blood cell counts within an acceptable level. The risk of bleeding is easily managed with platelet transfusions to keep your platelet counts above the level of haemorrhagic risk. Nowadays haemorrhagic complications are very uncommon.

### Organ damage

The chemotherapy used for the transplant can harm your organs, such as the heart, lungs, kidneys, liver, bones and joints, and nervous system. Damage to your organs may also come from infections.

### Infertility

The chemotherapy and radiotherapy given to treat your

disease can cause infertility. In some cases, fertility is affected for a short period and recovers when the treatment has finished, but in other cases fertility can be affected for longer.

Many people who are treated for cancer, particularly as children, do not experience infertility problems at all. It is difficult to determine who may be affected so it is worth discussing with your doctor before starting treatment.

If you are looking to start a family in the near future, then you may want to think about freezing your eggs or sperm before starting your treatment.

## Serious unexpected side effects

After a stem cell transplant you are at risk of experiencing other less common but serious side effects, including:

### Liver disease

The chemotherapy can cause the obstruction of the veins in your liver. It usually appears within the

first 20 days of transplantation and in most cases it is resolved within a few days.

## Complications in the lungs

Bleeding into the pulmonary alveoli (tiny air sacs in the lungs) is an exceptional but extremely serious complication that may appear during the first weeks after transplantation.

Other short term side effects include non-infectious pulmonary complications, such as idiopathic pneumonia, that may occur during the first two months post-transplant. It is more likely to happen in older patients.

## New cancers

Having a stem cell transplant increases your risk of developing a secondary malignancy. The main factors for developing secondary malignancies are the chemotherapy and radiotherapy given to treat your disease, certain infections and also genetic factors. Secondary malignancies are an extremely exceptional occurrence usually arising at

# Side effects (cont.)

least 10 years after the transplant.

## Side effects due to the stem cell transplant

A stem cell transplant carries several risks of complications, some potentially fatal. Some people experience minimal problems, but others may develop complications that require treatment or hospitalisation.

The risk can depend on many factors, including your specific disease, type of transplant and chemotherapy, your age and your general state of health. When you have a stem cell transplant, it is not possible for your doctor to know in advance what specific complications you may suffer or their intensity.

Two to three weeks after your transplant, the stem cells will engraft in your bone marrow (this is called haematopoietic rescue or implant) and initiate a stable production of the different blood components (leukocytes, red blood cells and platelets).

Your recovery is verified by a progressive increase in the number of leukocytes and platelets in your blood.

Complications associated with haematopoietic implant include:

- **Engraftment syndrome** - This term refers to the appearance of a series of signs and symptoms at around the time your neutrophils (a type of immune cell) are recovering. For this reason engraftment syndrome is thought to be caused by substances produced by immune cells, which cause leaking from blood vessels and organ dysfunction. Engraftment syndrome is characterised by the appearance of high non-infectious fever. The fever is usually associated to a rash, an incorrect oxygenation of the blood in the lungs and diarrhoea.
- **Cytomegalovirus (CMV) disease** - CMV is a common virus that can infect anyone. Once infected, the virus remains



latent ('sleeping') for life in peripheral blood leukocytes. In most people, this causes no symptoms and treatment is not required. Under certain conditions, such as when your immune system is low, the virus can be re-activated. If you are CMV-positive before your transplant, the virus can re-activate after the transplant because your immune system is weakened from the chemotherapy and immunosuppressant drugs.

- **Cataracts** - This is a clouding of the lens of the eye, which causes vision loss. Cataracts may appear at five to six years after transplantation if you have received total body irradiation. It is advisable that after a transplant you have annual ophthalmologic examination. Cataracts are easily resolved with surgery.

# What will happen if I go back into hospital after a stem cell transplant?

Once discharged, you may need to return to hospital for the treatment of some complication. The more frequent causes for rehospitalisation are insufficient fluid intake and infections.

You must contact your medical team immediately if you have any of the following symptoms:

- 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 another part of the body that doesn't 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 bouts of diarrhoea in a day
- New or worsening skin rash

You will also need to go back to hospital for regular checks. Hospital visits will be more frequent at the beginning but more spaced out as your health improves. In these visits, you will have blood tests, a physical examination and your medication will be reviewed. Complementary tests may include a bone marrow biopsy and a scan to check the state of your organs. In the long-term you may need to visit the hospital once or twice a year.

# What happens if my transplant doesn't work?

Your transplant may not work because the cells are not accepted by your body (graft rejection or graft failure) or because your original condition comes back after some time (relapse).

Graft rejection is not very common but it can happen at any time for the next two years after your transplant, as this is the time it may take for your immune system to recover fully. Your medical team will monitor you closely for signs of graft rejection. If graft rejection is confirmed, you may need another stem cell transplant.

Unfortunately, transplantation does not always ensure the eradication of your illness. The chance of the disease coming back varies depending on your disease and the type of transplant you have had. Relapses are more likely to happen in the first two years after transplantation, and are less common after five years. You will have regular checks to assure that your disease is not returning.

There are a number of treatment options at relapse depending on the type of disease, your state of fitness, your original response to the chemotherapy and the time from transplantation to relapse.

There isn't a general rule to treat relapse, so if your disease comes back after a transplant you should discuss with your medical team the different options available. If the relapse occurs after an autologous stem cell transplant, your doctor may consider allogeneic transplantation with reduced intensity conditioning (RIC); provided a compatible donor is available.

Some patients may not be able to have further treatment because of the high risk; and sometimes patients may decide not to continue their treatment. In these cases, you may have palliative care. Palliative care may involve transfusions, antibiotics and medication to help you deal with the symptoms of the disease. You and your family will receive advice and support from your medical team at all stages.

# Glossary

## Aplasia

A haematologic disorder in which the normal progression of cell generation and development does not occur.

## Allogeneic stem cell transplantation

A transplant modality in which donor and recipient are different persons.

## Autologous stem cell transplantation

A transplant modality in which donor and recipient are the same person.

## Bone marrow

The soft tissue located inside some bones, where blood cells generate.

## Bone marrow registry

The institution responsible for keeping a list of bone marrow donors and their characteristics.

## Bone marrow transplant

The process of transferring bone marrow cells from donor to recipient.

## Chemotherapy

A combination of one or more drugs to treat cancer.

## Conditioning treatment

A treatment with high-dose chemotherapy and/or radiation therapy given to prepare your body for a stem cell transplant. Depending on the intensity of the treatment there are three main types of conditioning: myeloablative, reduced intensity (RIC) and non-myeloablative.

## Cytomegalovirus (CMV)

A virus of the herpes family that can be re-activated in immunosuppressed patients who already had the virus before their transplant, or can be transferred when present in the cells from the donor. CMV infections can cause serious complications in

transplant patients.

### Engraftment

The correct implantation of transplanted cells in the recipient.

### Engraftment syndrome

A potential early complication around the time of neutrophil recovery after stem cell transplantation. Symptoms resemble those of GVHD.

### Graft

Living tissue that is transplanted surgically.

### Graft failure (stem cell failure)

A complication following a stem cell transplant where the cells of the donor fail to implant (engraft) in the recipient.

### Haematopoiesis

The biological process of blood cell formation.

### Haematopoietic rescue

The process of recovering the bone marrow function after

high-dose chemotherapy, by transplanting haematopoietic stem cells.

### Haematopoietic stem cells

Specialised cells responsible for producing all other blood cells.

### Human Leukocyte Antigen (HLA) antigens

A unique protein signature expressed on the surface of most cells in the body of every person.

### Immunosuppressive drugs (immunosuppressant)

A class of drugs that reduce the strength of the immune system.

### Leukocytes (white blood cells)

Immune cells responsible for fighting infection. These include T and B lymphocytes, granulocytes and monocytes.

### Lymphocytes

A subtype of leukocyte (white blood cell). Includes T and B lymphocytes (T and B cells) and natural killer cells.

# Glossary (cont.)

## Myeloablation

Condition in which bone marrow activity is decreased, resulting in fewer red blood cells, white blood cells, and platelets. It is a side effect of some cancer treatments.

## Peripheral blood stem cells (PBSC)

Circulating haematopoietic stem cells.

## Peripheral blood stem cells (PBSC) transplant

The process of transferring circulating haematopoietic stem cells from donor to recipient.

## Platelets

Circulating cells responsible for forming blood clots.

## Radiotherapy

A therapy that uses ionizing radiation, generally as part of cancer treatment.

## Red blood cells

Circulating cells responsible for

carrying oxygen.

## Relapse

The return of the disease after a period of remission.

## Secondary malignancies

New cancers arising from the chemotherapy used for treating a disease.

## Stem cell transplant

The process of transferring haematopoietic stem cells from donor to recipient.

## Tandem transplantation

A modality of stem cell transplantation where patients receive two consecutive stem cell transplants spaced a few weeks or months apart.

# Useful contacts and further support

There are a number of helpful sources to support you during your diagnosis, treatment and beyond, including:

- Your haematologist and healthcare team
- Your family and friends
- Your psychologist (ask your haematologist or CNS for a referral)
- Reliable online sources, such as Leukaemia Care
- Charitable organisations

There are a number of organisations, including ourselves, who provide expert advice and information.

## Leukaemia Care

We are a charity dedicated to supporting anyone affected by the diagnosis of any blood cancer.

We provide emotional support through a range of support services including a helpline, patient and carer conferences, support group, informative website, one-to-one buddy service and high-quality patient information. We also have a nurse on our helpline for any medical queries relating to your diagnosis.

Helpline: **08088 010 444**  
**[www.leukaemiacare.org.uk](http://www.leukaemiacare.org.uk)**  
**[support@leukaemiacare.org.uk](mailto:support@leukaemiacare.org.uk)**

## Bloodwise

Bloodwise is the leading charity into the research of blood cancers. They offer support to patients, their family and friends through patient services.

**020 7504 2200**  
**[www.bloodwise.org.uk](http://www.bloodwise.org.uk)**

## Cancer Research UK

Cancer Research UK is a leading charity dedicated to cancer research.

**0808 800 4040**  
**[www.cancerresearchuk.org](http://www.cancerresearchuk.org)**

## Macmillan

Macmillan provides free practical, medical and financial support for people facing cancer.

**0808 808 0000**  
**[www.macmillan.org.uk](http://www.macmillan.org.uk)**

## Maggie's Centres

Maggie's offers free practical, emotional and social support to people with cancer and their families and friends.

**0300 123 1801**  
**[www.maggiescentres.org](http://www.maggiescentres.org)**

## Citizens Advice Bureau (CAB)

Offers advice on benefits and financial assistance.

**08444 111 444**  
**[www.adviceguide.org.uk](http://www.adviceguide.org.uk)**

Leukaemia Care is a national charity dedicated to providing information, advice and support to anyone affected by a blood cancer.

Around 34,000 new cases of blood cancer are diagnosed in the UK each year. We are here to support you, whether you're a patient, carer or family member.

## Want to talk?

Helpline: **08088 010 444**

(free from landlines and all major mobile networks)

Office Line: **01905 755977**

**[www.leukaemiacare.org.uk](http://www.leukaemiacare.org.uk)**

**[support@leukaemiacare.org.uk](mailto:support@leukaemiacare.org.uk)**

Leukaemia Care,  
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Blackpole East,  
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WR3 8SG

Registered charity  
259483 and SC039207

**Leukaemia Care**  
YOUR Blood Cancer Charity

