

Your Essential Guide

Sept 2006



Introduction

This Essential Guide is written for patients who have been diagnosed with myeloma. It will also be helpful for their families and friends. It provides information on myeloma, its treatment and management. It is intended to help you understand the disease and to make informed decisions about your care and treatment options.

It focuses on the most frequently used myeloma treatments but does not cover all treatments in detail. You may prefer to read only the sections that apply to you; each section is self-contained to allow you to do this.

Some of the more unusual or technical words appear in bold the first time they are used and are described in the glossary of medical terms at the back of the booklet.

Aims of this Essential Guide

- To help you understand more about myeloma and its treatment
- To help you to make informed treatment decisions
- To provide information to carers and family members

Myeloma UK's *Living with Myeloma - Your Essential Guide* gives you an overview of many of the issues you may have to cope with in living with myeloma. Myeloma UK also has a range of Infoguides and Infosheets on specific treatment options, disease management and other topics relevant to patients and carers. You will find a list of the information available from us at the back of this Essential Guide.

If you would like to talk to someone about any aspect of myeloma, its treatment and management call the **Myeloma Infoline on 0800 980 3332**.

Your call will be answered by a Myeloma Information Nurse Specialist who is supported by medical and scientific advisors. The Infoline is open from Monday to Friday, 9am to 5pm, and is free to phone from anywhere in the UK. From outside the UK, call +44 131 557 3332 (charged at normal rate).

Disclaimer

The information in this guide is not meant to replace the advice of your medical team. They are the best people to ask if you have questions about your individual situation.

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What is myeloma?

Myeloma, also known as multiple myeloma, is a type of **bone marrow** cancer arising from **plasma cells**, which are normally found in the bone marrow. Plasma cells form part of your immune system.

Normal plasma cells produce **antibodies** (also called immunoglobulins) to help fight infection. In myeloma, the abnormal plasma cells release only one type of antibody known as paraprotein which has no useful function. It is often through the measurement of this paraprotein that myeloma is diagnosed and monitored.

Bone marrow is the 'spongy' material found in the centre of larger bones in the body (see Figure 1). As well as being home to plasma cells, the bone marrow is the centre of **blood cell** production (red blood cells, white blood cells and platelets).

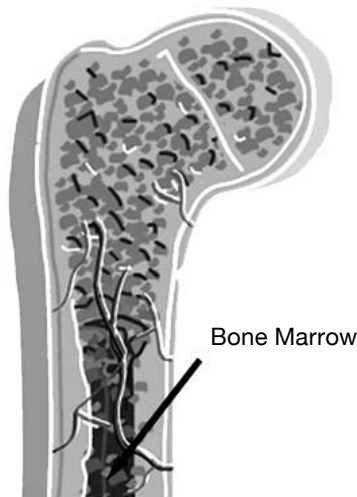


Figure 1 - Bone Marrow

In myeloma, the **DNA** of a plasma cell is damaged causing it to become malignant or cancerous. These abnormal plasma cells are known as myeloma cells. Unlike many cancers, myeloma does not exist as a lump or tumour. Instead, the myeloma cells normally divide and expand within the bone marrow.

Myeloma affects multiple (hence multiple myeloma) places in the body where bone marrow is normally active in an adult, i.e. within the bones of the spine, skull, pelvis, the rib cage, and the areas around the shoulders and hips.

The areas usually not affected are the extremities: that is the hands, feet, and lower arm / leg regions. This is very important since the function of these critical areas is usually fully retained.

Most of the medical problems related to myeloma are caused by the build up of myeloma cells in the bone marrow and the presence of the paraprotein in the blood or in the urine.

Common problems are bone pain, bone fractures, tiredness (due to **anaemia**), frequent or recurrent infections (such as bacterial pneumonia, urinary tract infections and shingles), kidney damage and **hypercalcaemia**.

Some people go on to develop myeloma after having been diagnosed with a benign (non-malignant) condition called **MGUS** which stands for Monoclonal Gammopathy of Undetermined Significance. This term describes the condition of the raised abnormal protein seen in myeloma (the paraprotein), but where there are no other features of the disease (less than 10% plasma cells in bone marrow and no evidence of bone disease).

The risk of transition from MGUS to active myeloma is very low; only a 1% chance each year of follow-up. Even if the myeloma cells are at a higher level of 10-30% of the total bone marrow, the growth rate can be very slow and represent indolent / **smouldering** or asymptomatic myeloma.

Both these conditions can change very slowly over a period of years and do not require active treatment. It is very important to establish the correct diagnosis distinguishing MGUS and indolent myeloma from active or symptomatic myeloma, which does require treatment.

There have been many new developments in the treatment and management of myeloma over the last few years that have had a significant impact on the way myeloma is treated. Research is on-going to develop new treatments and to use existing treatments in a better, more effective way. Many of the current and new developments are discussed in this guide.

Treatments for myeloma can be very effective at halting its progress, controlling the symptoms, and improving quality of life, but they are not able to cure it. Even after successful treatment, regular monitoring is needed in case the myeloma comes back.

In addition to the treatment you receive from your doctor, there are several things that you can do to make living with myeloma easier.

The *Living with Myeloma - Your Essential Guide* booklet, available from Myeloma UK, has further information on many of the issues you may have to cope with in living with myeloma. Myeloma UK also has an Infosheet available about MGUS. To order these publications contact the **Myeloma Infoline on 0800 980 3332**.

Basic Facts

- There are nearly 4,000 new cases per year in the UK
- Between 14-20,000 people are living with myeloma at any one time
- Myeloma accounts for 15% of blood cancers and 1% of cancers generally
- Median age of onset is 71 and only 5-10% of patients are under 40

Types of myeloma

Myeloma is often described as being a very individual disease; both in terms of the way patients experience complications and in the way they respond to treatment, all of which can vary greatly. Some of this variation is due to the different types and subtypes of myeloma.

Different types and sub-types of myeloma are based on the type of immunoglobulin (paraprotein) produced by the myeloma cell.

Each immunoglobulin is made up of a specific structure containing two principle components, heavy chains of which there are two and light chains of which there are also two (see Figure 2).

There are five possible types of heavy chain component denoted by the letters G, A, D, E and M, and there are two possible types of light chain component denoted by the Greek letters, Kappa (κ) and Lambda (λ).

Each individual immunoglobulin (Ig for short), can have only one of the five possible heavy chain types and only one of the two possible light chain types.

Most people with myeloma, about 65%, have what is called IgG type myeloma. That is immunoglobulin type G (one of the five possible heavy chains), with either the kappa or lambda light chain component.

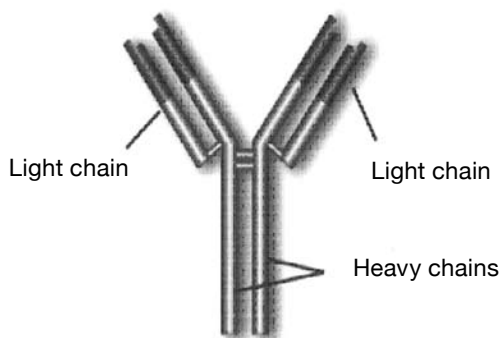


Figure 2 - Immunoglobulin Structure

The next most common type is IgA myeloma also with either kappa or lambda light chains. IgM, IgD and IgE type myeloma are all quite rare.

At the same time as producing one whole immunoglobulin structure, approximately 30% of patients will also produce light chains (such as kappa light chains) on their own which are detectable in the urine rather than in the blood.

In about 20% of patients, the myeloma cells produce light chains only (no heavy chains at all). This is called 'light chain' or '**Bence Jones**' myeloma.

More rarely, in about 1-2% of cases, the myeloma cells produce very little or no immunoglobulin of any type which is known as 'non-secretory myeloma' making diagnosis and monitoring very difficult. However, a recently developed test called the Freelite™ test has been able to detect minute amounts of light chains in the urine in most of the traditionally labelled 'non-secretory' patients, therefore making diagnosis and monitoring a bit easier.

There are subtle differences in the behaviours of the different types of myeloma. As you would expect IgG, the most common type, has all the usual features of myeloma. On the other hand, IgA-type can sometimes be characterised by tumours outside the bone, IgD-type can be accompanied by plasma cell leukaemia and is more likely to cause kidney damage.

The light chain or Bence Jones myelomas are the most likely to cause kidney damage and / or lead to deposits of the light chain component in the kidneys and or in nerves and other organs, resulting in a condition known as amyloid or light chain deposition disease.

Myeloma UK has a range of further information available about AL amyloidosis, including *AL Amyloidosis - An Introduction* and *AL Amyloidosis - Your Essential Guide*. You can order your free copy of these publications by contacting the Myeloma Infoline on 0800 980 3332.

What causes myeloma?

Although a large amount of research has been done to investigate the potential causes of myeloma, nothing has been proven to date.

Exposure to certain chemicals, radiation, viruses and a weakened immune system are thought to be potential causal or trigger factors. It is likely that myeloma develops when a susceptible individual has been exposed to one or more of these factors.

Because it is more common to develop myeloma later in life it is thought that susceptibility may increase with the ageing process and the consequent reduction in immune function, or that myeloma may result from a lifelong accumulation of toxic insults or **antigenic** challenges.

There is a rare tendency for myeloma to occur in families, but the likelihood is very low, and no tests are currently available for this. Even when myeloma occurs more than once within a family, this may be due to a common exposure to environmental factors, rather than it being hereditary.

Diagnosis, tests, investigations and staging

In order to diagnose myeloma, several tests and investigations need to be carried out. This is often a difficult and uncertain time for patients and their families. Tests and investigations are done for three main reasons:

- To establish a diagnosis
- To help determine a treatment plan and monitor progress
- To detect complications of the disease so that they can be treated

Myeloma is a very individual disease and results from these tests may vary from patient to patient. It is not enough just to make a diagnosis of myeloma; it is critical to have an accurate picture of the disease in each patient before an appropriate treatment plan can be developed.

Paraprotein measurement

As well as being important in diagnosing myeloma, changes in the level of paraprotein are usually a fairly good indicator of changes in the activity of the myeloma. For this reason, paraprotein measurements are done regularly to see how well treatment is working and to check that the myeloma is remaining stable during periods when you are not receiving active treatment.

If you have no paraprotein detectable after treatment you are normally considered to be in complete remission. If your paraprotein has fallen and is still detectable and stable after treatment you are normally considered to be in partial remission, also called a plateau phase. Complete remission is unusual except after high-dose therapy and **stem cell** transplantation.

It is termed a 'plateau phase' because a graph of the paraprotein results appear flat almost like a plateau. Both the level and duration of response are important when measuring how successful treatment has been.

X-rays of skeleton (skeletal survey)

Because myeloma can thin or erode the bones, one of the first investigations performed is often a skeletal survey. This is a series of X-rays used to detect any bone damage. X-rays can also be used to help detect new bone damage. Areas of bone damage show up on X-ray film as black shaded areas and are known as 'lytic lesions'.

Sometimes an even clearer picture of the bone is needed and you may have an MRI (magnetic resonance imaging) or CT (computerised tomography) scan. MRI scans can sometimes reveal the presence and distribution of myeloma in the bone and outside the bone while X-rays do not. **CT scans** provide more detail and can identify areas of bone damage which may not show up on X-ray.

Bone marrow biopsy (aspirate)

This involves putting a needle into your bone (usually your hip bone) to get a small sample of the bone marrow (this sample is sometimes called an aspirate), and is done under a local anaesthetic. This sample is then examined to count the percentage of plasma cells present in your bone marrow: normal bone marrow has less than 5% plasma cells; bone marrow in patients with myeloma may have between 10% and 90% plasma cells. This test may also be done at the beginning and end of treatment.

A better indication of the number of plasma cells is gained by doing a 'trephine biopsy' which means taking a small core of bone along with the marrow inside.

Along with blood and / or urine sampling these tests help to give a more comprehensive picture of response to treatment.

Full blood count

Throughout your treatment, you will have regular blood samples taken. As has already been mentioned, blood samples are used to measure the level of paraprotein present in the blood. In addition, part of every sample is normally used to count the make-up of some of the important cells in your blood; the red blood cells, which transport oxygen; white blood cells, which help fight infection; and platelets, which help the blood to clot.

These cell counts are important because:

- The white cell count tells your doctor if you are more at risk of infection
- The haemoglobin level (red cell count) tells your doctor if you are anaemic
- The number of platelets tells your doctor whether you are at risk of bleeding or bruising more easily than normal

Kidney function

Kidney function can be affected by certain unique features associated with myeloma and also from the effects of some of its treatment.

Blood tests are also used to help measure levels of urea and **creatinine** which are waste products that are normally filtered out by the kidney. High levels of urea and creatinine indicate poor kidney function.

Calcium measurement

Calcium is a mineral which is normally found in the bone. In patients with active bone disease due to myeloma, calcium is released from the bone into the blood stream, which can lead to higher levels of calcium in the blood (hypercalcaemia).

Albumin measurement

Albumin is a type of protein that normally makes up most of the protein found in the blood, but in myeloma, hormones (or **cytokines**) produced by the myeloma (mainly interleukin 6; IL 6) suppress albumin production in the liver.

Beta 2 microglobulin

A blood test can also be useful to detect levels of a molecule called **beta 2 microglobulin** ($\beta 2M$). $\beta 2M$ is one of the most important indicators of both the amount and activity of the myeloma and therefore is crucial in determining the prognosis of individual cases.

The appendix at the back of this guide includes a complete list of potential tests as well as some of the normal values.

Staging

On completion of a wide range of tests, your doctor should have a clear and in-depth picture of the specific characteristics of your myeloma. With this information, the myeloma is normally staged.

Staging indicates the amount of myeloma and therefore reflects the expected outlook for individual patients. The most common is the Durie and Salmon Staging System which classifies myeloma into three stages.

- Stage one: Early, low level of myeloma
- Stage two: Active, moderate level of myeloma
- Stage three: Active, high level of myeloma

Each of these stages can be sub-classified as type A (relatively normal kidney function) or B (abnormal kidney function).

Despite the usefulness of this staging system, it does not take into account some important factors such as β 2M. A new International Staging System (ISS) Classification for Multiple Myeloma has therefore been developed. This system takes into account additional factors to predict potential response to treatment. These factors are beta 2 microglobulin (β 2M) and albumin, which can both be assessed by doing a simple blood test.

To help identify patients with myeloma that may not be causing symptoms but which requires treatment, doctors may also use other criteria. The acronym 'CRAB' describes these criteria: (C) calcium elevation, (R) renal (kidney) insufficiency, (A) anaemia and (B) bone abnormalities (lytic lesions or bone loss).

Further details of these staging systems are provided in the appendix.

Treatment of myeloma

How your myeloma is managed will depend on whether the myeloma is getting worse and the degree to which it has affected your body.

Up until the last few years, the most commonly used treatments for myeloma were different kinds of **chemotherapy**, steroids, high-dose therapy and stem cell transplantation. Recently, however, two new treatments have been introduced into the range of drugs available: thalidomide and **VELCADE®** (bortezomib) (an analogue of thalidomide called **REVLIMID®** (lenalidomide) should be available soon).

There are also a number of supportive treatments to help treat the symptoms and complications that myeloma can cause. These include a group of drugs called **bisphosphonates** used to treat bone disease and bone pain as well as **erythropoietin** for anaemia.

Before embarking on treatment, however, patients and doctors need to make important decisions about what treatment is best or most appropriate and when to receive it.

The next few chapters look at some important points in making treatment decisions and provides a brief overview of the range of treatments available to treat both the underlying problem and the complications and symptoms due to myeloma.

Decision-making

Choosing treatment for myeloma is not a simple decision as no one treatment has been identified as being the best, and all patients are different. The advantages, disadvantages and side-effects arising from available treatments are often quite different. For this reason, being involved in deciding which treatment is right for you is very important.

You may prefer just to follow the advice of your doctor or to take a more active role in the decision-making process. Your doctor should be able to adapt his or her approach accordingly to suit you.

Generally, the best treatment for you will take account of:

- Your general health (for example, your kidney function)
- Your age (for example, it may affect whether high-dose therapy and stem cell transplantation is possible)
- Your personal circumstances and lifestyle
- Your priorities and preferences
- The nature of your disease
- Any previous treatments
- Level of complications
- Results and response to any previous treatment received

Making an informed decision is important and you should take as much time as you need to make one. However, in some situations there may be an urgent need to start treatment, for example, if you have significant kidney damage.

To help you understand more about your myeloma and the treatment options available, try to collect as much information as you feel you need.

Information is available from doctors, nurses, other patients, the Internet and Myeloma UK.

Listing the pros and cons of each option is a good way to help you decide what the best treatment for you is. Talking things over with your family, friends or another patient can help clarify your thoughts.

Your decision should take into account your personal priorities, your lifestyle and how you feel about the pros and cons of the treatment options that are available and their potential side-effects. The important thing is that you and your doctor agree together on the treatment you will receive.

Second opinions

The way cancer services are currently organised in the UK means that the hospital where you are being treated should involve a range of healthcare professionals working together as a team known as a multidisciplinary team.

Your treatment is likely to have been discussed by the team, although often only one doctor (usually the consultant haematologist) will look after you.

Because myeloma is not common, and choosing the right treatment is sometimes as challenging for doctors as it is for patients, you may feel that you want a second opinion to be sure that the diagnosis is correct, that the treatment plan is appropriate for your situation and that all other options have been considered.

Doctors are normally happy to arrange a second opinion and you should not feel that asking for one will offend him or the medical team. Your hospital doctor or GP can organise an appointment for you with another doctor (usually another consultant haematologist).

A second opinion can be obtained through the NHS, although some people prefer to go privately. Your notes will be passed on to the second doctor before your visit so they are familiar with your particular situation.

Sometimes people have difficulty in communicating with their doctor and want the chance to talk to another doctor. In this circumstance, you may ask to see a different doctor in the same hospital or to have a second opinion at another hospital.

What if I don't want any treatment at all?

Some patients feel that they do not want to have any type of toxic treatment and prefer to try an alternative approach. Unfortunately, there is no evidence that these alternative approaches work, although very occasionally patients report that by using these techniques they have lived with the disease for many years longer than was predicted.

It is important to remember that conventional treatments have been well tested in clinical studies and doctors have a clear understanding of how they work. The same cannot be said for alternative approaches. If you choose to use alternative ways of trying to control your disease, it is important to discuss this with your doctor as there are potential risks involved and you may choose to try conventional treatment at a later date.

If you choose not to have active treatment for your myeloma there are many supportive measures available, as outlined earlier, to help alleviate the symptoms of your disease. If specialist advice is needed with regard to symptoms such as pain it may be helpful to be seen by a palliative care specialist, who will be able to provide expertise in symptom control and supportive care.

Indications for starting treatment

The decision to start or not to start treatment is an important one. Not everyone diagnosed with myeloma will need treatment to control his or her myeloma immediately.

Because currently available treatment is not curative and has side-effects it is usual to wait until the myeloma is actively causing problems before starting treatment. Results from the tests and investigations listed earlier, along with other individual factors, will help determine when treatment should begin, what that treatment should be and provide a baseline against which response to treatment and disease progression can be measured.

What treatments are available?

You can think of the treatment and management of myeloma as being in three categories. These are:

- Active monitoring
- Treatments to control the myeloma itself
- Treatments for the symptoms and complications caused by the myeloma (discussed in a later section)

There is some overlap between these categories, since any treatment that controls your myeloma will have the added benefit of reducing the complications and symptoms you experience.

The following chapters describe the various treatments that are available and some of the circumstances under which particular treatments are used.

Initial or frontline treatment

Once you and your care team have decided that you require treatment to control your disease, you will need to decide jointly with your doctor what type of treatment is best for you. It is important to remember that, although these treatments can be very effective to control the myeloma, they do not generally cure the disease.

The main treatment options are:

- Treatment without high-dose chemotherapy and stem cell transplantation
- Initial treatment plus high-dose chemotherapy and stem cell transplantation

Most often, the initial treatment patients receive is chemotherapy, but it can also include other types of drugs such as steroids or thalidomide. General advantages and disadvantages for each treatment are described briefly after each section.

Initial chemotherapy

What is chemotherapy?

Chemotherapy means treating you with potent drugs that are intended to kill the myeloma cells in the bone marrow. Chemotherapy works by damaging myeloma cells and preventing them from being able to divide and reproduce.

Chemotherapy drugs attack cells in the body which divide rapidly such as myeloma cells, but also may affect other rapidly dividing cells such as those in the bone marrow, hair follicles and the lining of the mouth and the stomach. Unfortunately this means that chemotherapy treatment can have side-effects. The type of chemotherapy prescribed for myeloma patients depends on the individual and what is most suitable for them and their disease at any particular point in time.

What chemotherapy treatments are available?

When you are starting treatment for active myeloma the first decision that needs to be made is whether or not a stem cell transplant is planned initially or set aside as a future option (there are more details about transplants in the next section).

The most common treatment regimen used when a transplant is planned is a combination of drugs known as VAD or something similar such as VAMP, C-VAD or C-VAMP. These combinations include drugs of which some are given by IV and some given orally. Each of the letters in these combinations represents a different drug; in the case of VAD they are vincristine, adriamycin and dexamethasone. These regimes are often offered to younger patients but do unfortunately have more side-effects.

If a transplant is not planned then the combinations of drugs such as melphalan, prednisolone and cyclophosphamide are often used. The advantages of these are that the drugs can be taken orally rather than through an intravenous infusion and they generally have fewer side-effects.

Newer combinations, mostly in the context of clinical studies, incorporating thalidomide and Velcade can be used in both groups of patients. One example is the ongoing MRC IX study which is comparing the standard regime C-VAD with a novel combination CTD.

Less common types of chemotherapy combinations such as ESHAP and DT-PACE can be used in individual cases when the combinations above may be contraindicated.

See Table 1 on pages 21-22 for a list of common and novel chemotherapy combinations used in myeloma.

How are chemotherapy drugs given?

As has already been shown above, some chemotherapy drugs can be taken by mouth (oral) and others are given as an infusion into your vein (intravenous infusion or IV). You can take oral chemotherapy treatments at home, but you will need to visit the hospital to receive the intravenous chemotherapy.

If you are having your chemotherapy by infusion, you will normally have a small procedure to have a narrow plastic line inserted into a large vein. This line (the most common type is called a HICKMAN® catheter) allows all of your chemotherapy to be given without inserting a new line into your veins at each visit. Blood samples can also be taken through this line. A diagram of a HICKMAN® catheter can be seen here.

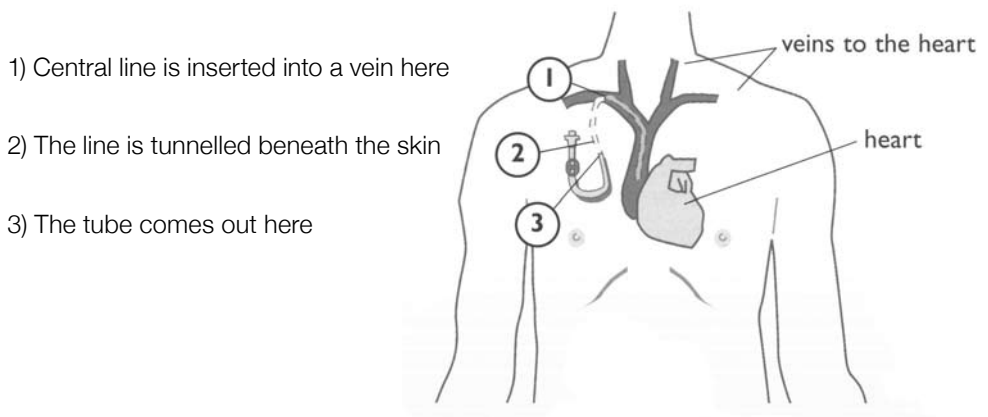


Figure 3 - HICKMAN® catheter

The part of the catheter outside your body is stitched or taped to the chest to ensure it does not come out; this may take some time to get used to, and you will have to learn some simple rules about looking after it, but most patients cope with this without any problems.

How long will my chemotherapy last?

A course of chemotherapy usually lasts for several months. It is given in cycles, i.e. a dose or a few days of treatment is given, followed by several days or weeks without treatment before the next dose is given. The exact details of the treatment schedule vary depending on the individual patient and the type of chemotherapy they are going to receive, so if you have specific questions about the timing of your treatment, your doctor is the best person to answer them.

The total length of the chemotherapy course often depends on which one(s) you are taking and how you respond to treatment, but is unlikely to last less than three to six months and no longer than 12 months.

What side-effects could I have?

Chemotherapy drugs are quite potent and while they can kill the myeloma cells, they can also cause potentially harmful side-effects. Each drug has its own side-effects, and even the same kind of chemotherapy produces different reactions in different people. It may be helpful to remember that almost all side-effects are only short term, usually easily managed and should gradually disappear once the treatment has stopped.

If you want to know about the side-effects which may be caused by your chemotherapy, you should ask your doctor or nurse. You should be given patient information leaflets for all of your drugs. If you are not, ask your doctor or pharmacist for them.

If you experience any side-effects that you think may be due to your treatment, it is important that you tell your doctor straight away. He or she may be able to give you medicines or suggestions to help, or may change your treatment to reduce the effects.

Some of the commonest side-effects of many chemotherapy drugs are sickness or vomiting, hair loss (alopecia), sore mouth (or mouth ulcers) and diarrhoea. Certain kinds of chemotherapy can cause infertility. If this is an important consideration for you, you may want to ask your doctor specifically about this.

Advantages and disadvantages of chemotherapy

The main advantages of chemotherapy is that it is effective in killing myeloma cells in most patients. This is helpful in improving symptoms and quality of life. In the majority of cases, chemotherapy is easy to administer and many forms can be taken at home or as an outpatient.

The main disadvantages include the fact that chemotherapy also kills healthy normal cells, potentially leading to unpleasant and occasionally harmful side-effects. Most importantly, however, over varying lengths of time myeloma cells can also become resistant to the chemotherapy.

Unfortunately, chemotherapy does not work for all patients and your doctor will monitor your progress carefully. If you do not respond to chemotherapy there are other approaches that can be tried. New research aims to improve the effectiveness of chemotherapy, reduce side-effects and look for alternatives.

If you would like further information about chemotherapy or other treatments, you can contact the freephone **Myeloma Infoline** to speak to a Myeloma Information Nurse Specialist on **0800 980 3332**.

Table 1 - Commonly Used and Novel Combinations

Commonly Used Combinations

Treatment Combination	Advantages	Disadvantages
<p>VAD</p> <ul style="list-style-type: none"> • Vincristine • Adriamycin • Dexamethasone <p>C-VAD</p> <ul style="list-style-type: none"> • Cyclophosphamide • Vincristine • Vincristine • Adriamycin • Dexamethasone <p>C-VAMP</p> <ul style="list-style-type: none"> • Cyclophosphamide • Vincristine • Adriamycin • Methylprednisolone 	<ul style="list-style-type: none"> • Responses in 70% • Doesn't damage stem cells • Forms basis for stem cell transplant <ul style="list-style-type: none"> • Symptoms of active disease may be controlled more rapidly and quality of first remission may be better 	<ul style="list-style-type: none"> • IV administration requiring a semi-permanent line • Vincristine can cause nerve damage
<p>Dexamethasone alone</p>	<ul style="list-style-type: none"> • Oral administration • Thought to provide a substantial percentage of the benefit of the full VAD 	<ul style="list-style-type: none"> • Can be poorly tolerated on an intensive schedule
<p>MP</p> <ul style="list-style-type: none"> • Melphalan • Prednisolone 	<ul style="list-style-type: none"> • Oral administration • Well tolerated • Responses in 50% • Well known protocol 	<ul style="list-style-type: none"> • Causes stem cell damage therefore reducing chances of stem collection if subsequent high-dose therapy is planned
<p>C-Weekly</p> <ul style="list-style-type: none"> • Cyclophosphamide 	<ul style="list-style-type: none"> • Oral administration • No stem cell damage 	
<p>ABCM</p> <ul style="list-style-type: none"> • Adriamycin • BCNU • Cyclophosphamide • Melphalan 	<ul style="list-style-type: none"> • Combination of oral and IV 	<ul style="list-style-type: none"> • May damage stem cells

Table 1 continued - Commonly Used and Novel Combinations

Novel / In Clinical Study

Treatment Option	Advantages	Disadvantages
<p>CTD</p> <ul style="list-style-type: none"> • Cyclophosphamide • Thalidomide • Dexamethasone <p>TD</p> <ul style="list-style-type: none"> • Thalidomide • Dexamethasone 	<ul style="list-style-type: none"> • Oral administration • No stem cell damage • Approximately 70% response 	<ul style="list-style-type: none"> • Potential side-effects with thalidomide: thrombosis / neurological complications
<p>PAD*</p> <ul style="list-style-type: none"> • Velcade • Adriamycin • Dexamethasone <p>VD</p> <ul style="list-style-type: none"> • Velcade • Adriamycin 	<ul style="list-style-type: none"> • No stem cell damage 	<ul style="list-style-type: none"> • IV administration • Frequent hospital visits required • Potential side-effects with Velcade;neurological complications
<p>MPT</p> <ul style="list-style-type: none"> • Melphalan • Prednisolone • Thalidomide 	<ul style="list-style-type: none"> • Oral administration 	<ul style="list-style-type: none"> • Thalidomide side-effects • May damage stem cells if subsequent high dose planned

* Velcade was originally known as PS341

High-dose therapy and stem cell transplantation

What is high-dose therapy and stem cell transplantation and why is it needed?

Using very high doses of chemotherapy, usually with a drug called melphalan, can potentially kill more myeloma cells than is possible with standard doses of chemotherapy and lead to a much better overall response.

However, because the normal bone marrow is very badly damaged by the high doses of chemotherapy, blood cell counts would fall to dangerously low levels, causing the risk of anaemia, infections and excessive bleeding.

A transplant of healthy stem cells previously collected from the patient (or more rarely a donor), offers a way around this problem. It provides a means of giving higher doses of chemotherapy to consolidate previous chemotherapy treatment, without causing permanent damage to blood cell production.

Blood-forming stem cells exist in the bone marrow and have the capacity to divide and develop into the three main types of cells found in the blood and are a vital component of high-dose therapy and stem cell transplantation (see Figure 3).

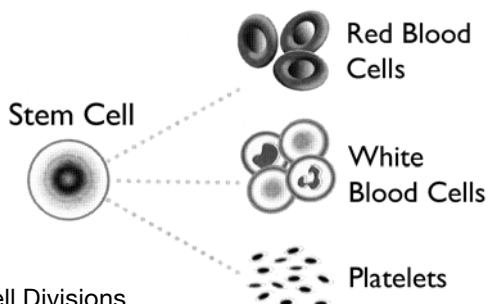


Figure 4 - Stem Cell Divisions

Stem cells can either be taken from you (collected earlier in your treatment and stored frozen) or, much less frequently, from someone else, usually your brother or sister, who has donated his or her cells.

Peripheral blood stem cells are collected (or harvested) prior to receiving the high doses of chemotherapy, by a process called apheresis. This involves passing your blood (or the donor's blood) through a machine that separates and collects the stem cells, and returns the remainder of the blood back to you or the donor.

What are the types of transplant that are available?

If your own stem cells are used for the transplant, it is called an autologous transplant; if stem cells from a donor are used, it is called an allogeneic transplant. It is very important to understand that there are significant differences between these two types of transplant, both in their potential benefits and the risks involved.

Autologous transplantation

This is the most common form of transplantation used in myeloma. In this kind of transplant, bone marrow recovery takes about two weeks. Blood and platelet transfusions may be required until the bone marrow recovers and **antibiotics** are usually given to prevent infections.

Most people stay in hospital until their **blood counts** return to a safe level; this normally means spending three to four weeks as an inpatient. During this time, you will probably feel quite unwell and be kept in protective isolation in hospital to avoid any infections.

Hospitals generally allow patients to bring personal items to make their room more comfortable. They also have varying policies on visitors during the time in isolation, so check with your healthcare team.

The high-dose therapy and stem cell transplantation process can be very debilitating and several weeks of slow convalescence at home after the procedure may be needed. The main advantage is the possibility of achieving an excellent response and long remission with a low level of risk from the treatment. Disadvantages include more toxicity than standard dose chemotherapy and the reality that relapse still occurs.

Allogeneic stem cell transplantation

Allogeneic transplantation involves collecting stem cells from either the bone marrow or peripheral blood of another person (the donor) and giving them to the patient (recipient).

Because myeloma effectively 'shuts off' a vital part of your own immune system that would normally kill myeloma cells, allogeneic transplants aim to use the immune system from the donated cells to help directly fight the myeloma in the patient (recipient).

These donated cells will eventually replace the immune system of the patient and therefore, hopefully, will continue to fight off the myeloma.

A transplant of stem cells from a donor has two main advantages: the transplanted cells do not contain any myeloma cells (no contamination), and the donor's immune system has the ability to recognise and destroy myeloma cells.

The disadvantage of using a donor is that the donor's immune cells will recognise the patient as 'foreign', and this can trigger a serious complication called '**graft-versus-host disease**' (GvHD). This is an adverse reaction that can affect the skin, liver and gut, causing serious problems, which may even be fatal.

In those patients who cope with the transplant and the complications, a number may have no detectable myeloma and potentially achieve a longer remission.

Even if the myeloma does recur, the transfusion of more of the donor's immune cells, collected from their blood, can help to destroy the myeloma cells again. This procedure is called a donor lymphocyte infusion, or DLI.

If a patient does not have a brother or sister with the same tissue type as the patient, it is sometimes possible to find a donor who is not related. This type of transplant is called a 'matched / volunteer unrelated donor' (or M / VUD) transplant.

The problems associated with this form of transplant are even greater than with a related donor. Although these transplants are very rare, they do happen but not enough have been done to show what the long-term benefit may be.

In order to reduce the risks associated with an allogeneic transplant, while still holding on to the benefits of giving donor cells, a newer type of transplant has been developed. This is the reduced-intensity conditioned transplant or the **mini-allogeneic transplant**, which involves giving a lower dose of chemotherapy than would be used for a standard allogeneic transplant.

If you would like further information about stem cell transplants see Myeloma UK's Infoguide on *High-Dose Therapy and Stem Cell Transplantation*. To order your free copy, contact the Myeloma Infoline on 0800 980 3332.

Treatment for symptoms and complications due to myeloma

Unlike many other cancers, myeloma can affect the body in several ways. This is due both to the activity of the myeloma cell itself, and to the release of a variety of proteins and other chemicals into the local bone marrow microenvironment and directly into the blood stream.

It is important to remember that not everyone will experience all of these and that effective treatments are available.

The most common symptoms and complications of myeloma, how they affect the patient, and how they are managed, are described below.

Bone disease

Bone disease is one of the most common complications of myeloma. The myeloma cells release chemicals that activate **osteoclast** cells, which destroy bone, and block **osteoblast** cells, which normally repair damaged bone.

When this happens, the bone is broken down faster than it can be repaired, leading to bone pain, bone **lesions** or even fractures. The middle or lower back, the rib cage and the hips are the most frequently affected areas. Fractures occur most often in the spine (vertebrae) or ribs. Fractures can sometimes occur with only minor pressure or injury. Fractures of the vertebrae can lead to their collapse causing pain, loss of height and curvature of the spine.

The treatment of bone disease in myeloma has been revolutionised in recent years by a group of drugs called bisphosphonates. Bisphosphonates correct hypercalcaemia, control existing bone disease, and slow down any further bone destruction. They work by coating the bone and blocking the activity of the cells that break down the bone.

In the UK, three bisphosphonates are currently licensed for the treatment of hypercalcaemia and / or bone disease in myeloma. They are:

- Sodium Clodronate (BONEFOS®, LORON®), which is taken by mouth as tablets
- Pamidronate (AREDIA®), which is given as a monthly intravenous infusion
- Zoledronic acid (ZOMETA®), which is given as a monthly intravenous infusion

Evidence from clinical studies with bisphosphonates has shown that there is a benefit to be gained by giving bisphosphonates to any patient with active myeloma, whether they have symptoms of bone disease or not.

The three drugs listed above are all effective and there is no evidence that one is more effective than the other.

The important difference between them is that clodronate can be taken by mouth rather than through an intravenous infusion.

Pain and poor healing of the jaw (known as **osteonecrosis of the jaw**) particularly after tooth extraction, has been reported in a small number of cases. It is not yet certain if this is related to the bisphosphonate treatment, but as a precaution, patients should have regular dental check-ups and inform their doctor prior to any oral surgery / tooth extractions.

For further information about bone disease and bisphosphonate see Myeloma UK's Infoguide *Bone disease and Bisphosphonates*. To order a copy, contact the freephone **Myeloma Infoline on 0800 980 3332**.

Pain control

Pain is the most common symptom for patients diagnosed with myeloma and is often related to underlying bone disease. The effective management of pain and its relationship to quality of life is critical and just as important as the treatment for the actual myeloma.

As with myeloma more generally, pain is very specific to the individual and treatment will vary. Medication should aim to provide continuous pain relief whenever possible with a minimum of drug related side-effects.

Complementary therapies such as relaxation techniques, aromatherapy and hypnosis have been shown to have some benefit for individual patients.

In some more serious cases medication and / or complementary therapies will need to be supplemented by other types of treatment such as:

- Localised radiotherapy (low dose): This has been shown to help control 'hot spots' of active bone disease and pain.
- Percutaneous vertebroplasty: Vertebral collapse in the spine can often occur with myeloma. Percutaneous vertebroplasty is a procedure which involves the injection of cement into the vertebral body; it has been shown to significantly reduce pain.
- Balloon kyphoplasty: Similar to percutaneous vertebroplasty but involves the insertion of a small inflatable balloon into the vertebral body to restore vertebral height before injecting the cement. This procedure has also been shown to significantly reduce pain.

Fatigue

The most important part of treating fatigue is actually recognising it. It is important that you tell your doctor how you feel because there are several things that he or she can do to treat some of the causes of fatigue. Fatigue is often described as a vicious cycle, but the cycle can be broken, allowing you to manage it. There are things you can do to help yourself or be helped by those caring for you.

Planning activities to avoid overtiring yourself is something that you and your carers can do together. Eating a healthy, balanced diet, taking regular light exercise and ensuring that you get enough sleep can all play a part in reducing the impact fatigue has on your quality of life.

Fatigue caused by anaemia can also be treated with blood transfusions and also with a drug called erythropoietin (see overleaf for more information on anaemia)

Kidney damage

Kidney problems can occur in myeloma for a variety of reasons. The abnormal protein produced by myeloma cells can damage the kidneys; this is particularly common with the Bence Jones protein. Other complications of myeloma, such as dehydration and hypercalcaemia (see above) as well as some of the drugs used to treat myeloma and its complications can also cause kidney damage (especially anti-inflammatory medicines).

The most important thing you can do to reduce the risk of kidney damage is to drink plenty of fluid. You should try to drink at least three litres (five pints) of water per day. Avoid using a certain type of drug called a non-steroidal anti-inflammatory drug (such as aspirin or ibuprofen), which are commonly used as painkillers. These drugs may contribute to kidney problems.

There are many ways to treat kidney damage in myeloma, depending on the cause. In many cases, the kidney damage is temporary and your kidneys can recover. In a small proportion of patients, the kidney problems become permanent, so they require a regular treatment called **dialysis**. This is a way of filtering the blood using a dialysis machine in the same way that kidneys would do if they were healthy.

Complications of reduced blood cells

- Too few red blood cells results in a low haemoglobin level, causing anaemia, which leads to tiredness and weakness
- Low levels of white blood cells can make you more likely to get infections
- Low levels of platelets may mean that you bruise or bleed more easily

Anaemia and infections

In adults, almost all red blood cells, white blood cells and platelets are made in the bone marrow. Red blood cells contain a protein called haemoglobin which carries oxygen around the body. White blood cells help your body fight infection. Platelets are small cells that circulate in your blood, and are important for helping your blood to clot.

Because myeloma cells crowd out the other cells produced in the bone marrow fewer are produced. This shortage of blood cells can lead to conditions such as anaemia or to more frequent infections.

Anaemia is a reduction in the number of red blood cells or the oxygen carrying haemoglobin they contain. It can occur as a result of the myeloma or as a side-effect of treatment and can cause symptoms of fatigue and weakness.

Anaemia does not always need treatment because bone marrow is often able to recover, especially if treatment is bringing the myeloma under control.

If anaemia needs treatment, a blood transfusion can help, there is also a drug called erythropoietin (or EPO) which can stimulate the body to produce more red blood cells.

Low white cell counts may not always need to be treated, but you should be alert for symptoms of infection (such as fever, coughing up green spit, pain in passing urine) and tell your doctor about them straight away.

If your white cell count falls very low, your doctor may give you a course of antibiotics to try to prevent infections before they take hold. There are also drugs (called growth factors) that can stimulate the body to produce more white blood cells.

If your platelet count falls to very low levels, it can be boosted by a transfusion of platelets.

Key Points

- Be honest about any problems you are having; describing them as accurately as possible will help you get the right treatment
- Acting early can reduce the number and severity of the complications associated with myeloma
- Bone disease can be treated effectively with bisphosphonates, and early treatment can slow down bone problems
- Drink lots of water to prevent kidney problems
- If you buy painkillers, tell the pharmacist that you need to avoid non-steroidal anti-inflammatory drugs
- Tell your doctor or nurse straight away if you think you have an infection

Maintenance treatment

Maintenance treatment aims to prolong the period of response to treatment, whether in remission or plateau. **Interferon** and steroids, such as **dexamethasone**, can be used as maintenance treatments. However, not all patients will benefit from these treatments and any benefits will have to be balanced against the side-effects that may occur.

Such side-effects can be significant with both interferon and dexamethasone. Recently, thalidomide has been used as a maintenance treatment and results so far have been very encouraging.

Other new treatments such as Velcade and some types of vaccines are being considered as potential maintenance treatments in ongoing clinical studies.

Treatment for relapsed or resistant myeloma

If your myeloma returns, this is called a relapse. This can be a very disappointing and distressing time for patients, their families and carers. Talking things over with your doctor, family / carer or another patient can help. Myeloma UK, or one of the organisations listed at the back of this Essential Guide, are also good sources of support and information at this time.

If your myeloma returns, you and your doctor will need to consider what treatment will be needed to try to regain control of your disease. You and your doctor may already have considered options for managing relapse in the initial treatment plan.

However, because the risks and benefits of treatment are not as clear in people whose myeloma has relapsed, many doctors like to discuss all the options again, as your views and the disease characteristics may have changed.

In some patients, the original treatment can be repeated successfully, especially if the initial response to treatment was good. In other patients, the myeloma may not respond to the treatment that was used previously; this is called resistant or refractory disease.

If your myeloma is resistant / refractory to the original chemotherapy, there are still many options open to you.

These include:

- Trying a different type of chemotherapy
- Undergoing high-dose therapy and stem cell transplantation
- Thalidomide therapy
- Velcade therapy
- High-dose steroid therapy
- One of several experimental treatments such as Revlimid

Trying a different type of chemotherapy

If you are refractory to an **alkylating** chemotherapy such as melphalan, you may respond to a VAD-type regimen.

Conversely, if you are a younger patient who has failed to respond to VAD as initial / frontline therapy prior to planned high-dose therapy and stem cell transplantation you may still respond to high-dose melphalan and still receive a stem cell transplant.

Thalidomide (see below) alone, in combination with dexamethasone or with dexamethasone plus cyclophosphamide is increasingly being used for relapsing / refractory disease.

More intensive combinations such ESHAP or DT-PACE may be an option in younger patients such that high-dose therapy and stem cell transplantation may still take place.

High-dose therapy and stem cell transplantation

High-dose therapy and stem cell transplantation may be considered in patients who have not had a prior stem cell transplant. In selected patients, a second transplant procedure may also be an effective strategy, especially if they have had a good initial response.

Thalidomide

Thalidomide, which was found to be effective in some people with myeloma in the late 1990s, may be offered to patients whose disease has relapsed and is resistant / refractory despite the use of several standard approaches to treatment i.e. conventional chemotherapy or high-dose therapy and stem cell transplantation.

Thalidomide is given as tablets which are normally taken every day. It can control the disease and reduce the amount of myeloma present, and so improve symptoms; often it can induce a plateau of the disease or even a remission.

Velcade

The introduction of Velcade is a major advance in the treatment of myeloma as it is the first of a new type of anticancer drug that works in a different way from chemotherapy and thalidomide.

It is given intravenously twice per week for two weeks, followed by a week's rest period. This completes one cycle of treatment, and up to eight treatment cycles are usually given.

Although patients do not normally need to be admitted to hospital, they do have to travel to the hospital quite regularly for several weeks to have their treatment.

Velcade and thalidomide are beginning to be recognised as standard therapy and before long will be used at all stages of the disease including as initial treatment

Steroids

High-dose steroid treatment with dexamethasone can be effective in controlling myeloma in patients who cannot have chemotherapy because of their general health, or in patients who have relapsed more than once following chemotherapy.

Experimental approaches

The thalidomide derivative Revlimid has recently been shown to produce a response in patients with relapsed / refractory disease while the addition of dexamethasone seems to produce additional responses in some patients who have not responded to Revlimid on its own.

If you would like further information about treatment, Myeloma UK have a range of Infoguides and Infosheets available, including *Thalidomide and Myeloma*, *Velcade* and *Revlimid*. To order any of these publications, contact the freephone Myeloma Infoline on 0800 980 3332.

How do I know if my treatment has worked?

As mentioned earlier, the aim of treatment is to control the disease and its effects on the body. In order to find out how a patient responds to treatment, several tests will be carried out on a regular basis.

These tests may vary from patient to patient, but generally would include regular blood and urine testing, between one and two **bone marrow aspirates** per year and occasional X-rays or scans.

The signs that treatment is working are a fall in the paraprotein level, less bone pain, improvement in anaemia and a reduction in the number of plasma cells in the bone marrow. However, one of the best indicators of response to treatment is an improvement to the general health of the patient.

In general terms, disease response is measured and categorised as in Table 2a and 2b on page 38 – Measuring Response to Treatment.

It is important to note once again that the duration of response is as important as the level of response.

Table 2 - Measuring Response to Treatment

Table 2a European Group for Blood and Marrow Transplantation (EBMT) response categories 2001

Treatment Outcome	Definition
Complete remission response (CR)	No detectable paraprotein in the blood and normal percentage of plasma cells in the bone marrow or absence of myeloma cells in the bone marrow.
Very good partial response (VGPR)	Greater than 90% decrease in paraprotein since start of treatment
Partial response (PR)	Greater than 50% decrease in paraprotein
Minimal response	More than 25% but less than 50% decrease in paraprotein
Stable disease (SD)	<25% decrease in paraprotein but not increasing
Progressive disease (PD)	Greater than 25% increase in paraprotein or detection of new bone abnormalities

Table 2b International Myeloma Working Group (IMWG) uniform response criteria 2006

Treatment Outcome	Definition
Stringent Complete Response (SCR)	CR as defined below plus normal free light chain ratio, absence of clonal cells in bone marrow
Complete Response (CR)	≤ 5% plasma cells in bone marrow, no detectable paraprotein
Very Good Partial Response (VGPR)	90% or greater reduction in blood and urine paraprotein
Partial Response (PR)	≥ 50% reduction of paraprotein in blood and 24 hr urinary paraprotein by ≥ 90%
Stable disease (SD)	Not meeting criteria for CR, VGPR, PR or progressive disease

New treatments and clinical studies

A great deal of research is going on to find more effective and less toxic treatments. Many new treatments are in development and some of the most promising ones are discussed here.

However, until the effectiveness and safety of these treatments has been established, they are generally only considered for patients whose disease has progressed or returned after more established treatments.

The best and safest way to take any new drug or treatment is as part of an approved clinical study. It is important to understand that not every patient is suitable for every new treatment but if you are interested in trying a new treatment, you should discuss this with your doctor or nurse.

Clinical studies are planned investigations, involving patients designed to test new treatments or to compare different types of current treatment. They are run according to a strict set of guidelines called a protocol.

All patients involved in a study are closely monitored. The information collected during the course of the study is combined and analysed by trained researchers. The results will help to determine which are the best treatments, and so help improve care for patients in the future.

If you would like further information about clinical studies, Myeloma UK's Infoguides on *Clinical Studies* and *MRC Myeloma IX* are available free of charge by calling the **Myeloma Infoline on 0800 980 3332**.

Among the most promising new treatment is a drug called Revlimid. Results from studies using Revlimid have been very positive. Although currently, Revlimid can only be obtained if you are participating in a clinical study, it is expected to be licensed in 2007 and therefore will be more widely available in the not too distant future.

Other new approaches include targeted treatments and **monoclonal** antibodies, which are intended to attack myeloma cells while leaving healthy cells alone; vaccines, which try to boost the immune system's ability to attack myeloma cells; and targeted radiotherapy, which aims to direct cell killing **radiation** at myeloma cells without affecting the rest of the body.

Many new combinations of drugs are already in use and are being tested in clinical studies across the disease spectrum, such as CTD (cyclophosphamide, thalidomide and dexamethasone) and T-Dex (thalidomide and dexamethasone). Newer combinations incorporating Velcade and Revlimid with current standard treatments are also underway.

In transplantation, a new type of allogeneic stem cell transplantation called a 'mini'-transplant (also known as a reduced-intensity conditioned allogeneic transplant) is being investigated. This is expected to have a lower risk of complications than the standard allogeneic transplant.

Another transplant technique being investigated is the 'tandem' transplant. This involves carrying out a second autologous transplant as soon as the patient recovers from the first to try to increase the level of response and extend the period of remission.

Because both approaches are relatively new and have not yet been fully evaluated, they should only be carried out within the context of a clinical study and in a hospital, where the staff are experienced in doing such transplants.

Sadly, not all new treatments are better than standard treatments so it is important to carry out clinical studies to test these new treatments thoroughly.

Being asked to participate in a clinical study does not necessarily mean that you are being asked to try a new treatment. The study may be testing new ways of using current treatments. In some hospitals, treating cancer patients in clinical studies is part of standard practice.

As more is discovered about these experimental treatments, their role alongside the more established treatments will become clearer. In time, if they are proved to be more effective and safer, they may replace some of the existing treatments.

Living with myeloma

Being told you have myeloma affects everyone differently. At first you might be overwhelmed, in shock and feel numb. Information may not sink in at this point but don't worry, you will have many opportunities to ask questions again.

Sometimes you might feel totally in control of your feelings and at other times strong emotions may catch you unawares. You may feel a great deal of fear, anger and frustration. These feelings are common and a natural part of coming to terms with the diagnosis.

Learning more about myeloma, your treatment options and life after myeloma treatment can help ease these feelings. Those around you may feel some of the same things you are feeling - they will also need support. Talking together about how you feel can help.

Many patients experience depression and anxiety at some stage in their illness. Although sometimes you may feel optimistic, there may be other times when you feel overwhelmed. You may have difficulty sleeping, become irritable, or lose interest in the things that you normally do.

It is important to recognise the symptoms and to discuss them with your doctor or nurse. Psychological complications are treatable once the doctor knows about them.

Emotional support

Emotional support is important in helping you live with myeloma. It is very easy for patients and family members to feel isolated, and strong emotions often make it difficult to discuss worries or fears. Talking to someone who understands what is happening can ease these feelings of isolation.

Many people find their specialist nurse is a good person to talk to, or you can call the **Myeloma Infoline on 0800 980 3332** to talk to a Myeloma Information Nurse Specialist. If you find your emotions difficult to cope with, ask your doctor to refer you to a counsellor or someone else who can help.

Support groups provide an informal and comfortable atmosphere in which members can share experiences and information. Many people assume that they will be full of doom and gloom, but generally they are not. They are a supportive group of people who are facing the same things that you are.

Some support groups are run by patients and family members, others by healthcare workers or professional group facilitators. If there is not a myeloma group, there may be a general cancer / haematology group that meets locally.

Call the **Myeloma Infoline on 0800 980 3332**, or ask your doctor for the details of myeloma support groups near you.

Family members can offer each other support by talking and listening. Being a good listener is an effective way to offer support and help ease anxiety of others. It is difficult to know how another person is feeling but trying to understand and empathising can help.

Counsellors offer you the chance to explore your feelings and experiences in a supportive, confidential environment. A counsellor does not give you advice but helps you to find your own answers to the problems you are facing.

Counselling may not always be available in your hospital but your doctor or nurse should be able to put you in touch with a professionally trained counsellor in your area. Alternatively you can contact the British Association for Counselling and Psychotherapy, for a list of registered counsellors in your area.

Myeloma UK holds regular Patient and Family Myeloma Infodays; they provide a great opportunity to meet and share experiences with other patients and carers as well as to learn from a team of myeloma experts. For more information contact Myeloma UK at 0131 557 3332.

Communication with your medical team

Good communication with your medical team will involve a lot of trust and collaboration. You should feel comfortable asking them questions and discussing treatment options. Learning more about myeloma and the pros and cons of different treatments will help you to communicate more easily with them. Any treatment decision should be reached together.

Sometimes doctors and nurses forget that patients do not speak their medical language. If you do not understand something say so! It is better that it is explained twice rather than you go home confused and worried.

Remember that your doctor may not be able to answer specific questions about your future. For example, you may want to know whether your treatment will be successful before you have it. Your doctor will probably be able to give you average figures but these are not going to be specific to you.

Tips:

- Write questions down and give a copy to your doctor at the beginning of your consultation
- Carry a piece of paper with you to write down questions as they occur to you
- Always tell your doctor if you are taking any medications you have bought at the chemist or supermarket
- Tell your doctor if you are experiencing side-effects

Whatever it is you are facing, Myeloma UK will be able to help you make sense of it, and you should use its services whenever and as often as you like.

Questions for your doctor / medical team

Diagnosis

- What tests will I need to have?
- When will I get the results?
- Will I need to have treatment?
- What is it likely to be?
- Are my bones affected?
- Are my kidneys affected?
- Who will be my main point of contact at the hospital from now on?
(Write their details in this Essential Guide)

Treatment

- What are my treatment options?
- Can I choose which treatment to have?
- What is the aim of this treatment?
- How successful has it been in the past?
- What would happen if I choose not to have this treatment?
- Is this treatment part of a clinical study?
- How experienced are you and your team in delivering this treatment?
- How is the treatment given, how long will it take?
- Will a hospital visit / stay be needed?
- How will I feel before, during and after this treatment?
- Will there be side-effects, when will I experience them and how long will they last?
- Will treatment affect my chances of having children in the future?

Post-treatment

- How often should I have check ups and blood tests?
- Will I receive any other treatments e.g. bisphosphonates and maintenance treatments?
- How will I know if the myeloma has come back?

Carers

Carers often have different information needs. If you are a carer you will want to know what you will need to do for the patient as they go through treatment.

- Will the patient require a stay in hospital, and for how long?
- Will the patient require a lot of looking after?
- What kind of quality of life do you expect the patient to have?
- Who can I call in an emergency?

Self-help checklist

- Learn about myeloma and its treatment - Many useful booklets and websites are available
- Join a support group; it can help to talk about how you feel
- Use the Myeloma Infoline - 0800 980 3332
- Find out from your GP, hospital doctor or nurse what services and benefits you are eligible for and ask for help if you need it
- Ask for a contact name and number for a member of staff in your Haematology Department - Write it in this booklet
- Bring any side-effects to the attention of your doctor
- Describe symptoms simply and accurately - Do not underplay or exaggerate them
- Take all medication as directed - Use segmented pillboxes to help you remember what to take and when
- Patients, try to drink three litres of water / liquid each day
- Carers, take care of your own health
- Put aside time for relaxation
- Recognise signs of stress or depression (feeling low, disturbed sleep, headaches, lack of appetite) and bring them to the attention of your doctor
- Make getting enough sleep a priority
- Try to do one thing that you enjoy every day
- Carers, take some time for yourself each day, try getting out of the house if possible
- Think positively, but allow yourself to have off days
- Keep a diary of your symptoms

Further information and useful organisations

General information and advice on self management

Cancerbackup

www.cancerbackup.org.uk

0808 800 1234 (Monday–Friday, 9am–8pm)

Cancerbackup helpline workers are trained oncology nurses who can provide information and support to people affected by cancer. Also produce a wide range of printed patient information.

Cancer Black Care

www.cancerblackcare.org

0208 961 4151 or 0207 501 8787 (Monday–Friday, 9am–5pm)

Provides information, advice and support services for members of the black and minority ethnic communities.

Leukaemia CARE

www.leukaemiacare.org.uk

0800 169 6680 (24hrs)

The Care Line is staffed 24 hours a day, 7 days a week by trained volunteers who can offer information on leukaemia and other blood disorders, befriending and support. Leukaemia CARE also offers discretionary financial assistance and caravan holidays in the UK.

Leukaemia Research Fund

www.lrf.org.uk

0207 405 0101 (Monday–Friday, 9am–5pm)

LRF funds research into leukaemia and related blood disorders. They provide printed information on myeloma and on stem cell transplantation.

Tenovus Cancer Information Centre

www.tenovus.com

0808 808 1010 (Monday–Friday, 9am–4:30pm)

Tenovus is a charity committed to the control of cancer through research, education, counselling and patient care. Their freephone Cancer Helpline offers information and support to those affected by cancer.

Irish Cancer Society (Republic of Ireland)

www.cancer.ie

1 800 200 700 (Weekdays 9am–5pm and Tuesdays until 9pm; if calling from the UK dial 00 3531 2310 500).

The Cancer Helpline provides advice, support and information to those affected by cancer living in the Republic of Ireland.

Ulster Cancer Foundation (Northern Ireland)

www.ulstercancer.org

0800 783 3339 (Monday–Friday, 9am–5pm)

Offers information, support and counselling to people affected by cancer in Northern Ireland. The freephone helpline is staffed by specially trained nurses with experience in cancer care.

Emotional support

British Association for Counselling and Psychotherapy

www.bacp.co.uk

0870 443 5252 (Monday–Friday, 8.45am–5pm)

BACP provide information on counselling and can give you a list of local registered counsellors.

Depression Alliance

www.depressionalliance.org

0845 123 2320 (Information pack request line)

This organisation provides information, support and understanding for those affected by depression. They have a network of self help groups throughout the UK. Depression Alliance also produces a wide range of publications covering various aspects of depression.

Relate

www.relate.org.uk

0845 130 4016 (Monday–Friday, 9am–5pm)

Relate offers a confidential counselling service for couples or individuals experiencing difficulties in their relationship. Relate provide support face-to-face, by phone or through their website.

Medical and palliative care

Hospice Information

www.hospiceinformation.info

0870 903 3903 (Monday–Friday, 9am–5pm)

Offers information to health professionals and the general public on hospice and palliative care services in the UK.

Macmillan Cancer Support

www.macmillan.org.uk

CancerLine 0808 808 2020 (Monday–Friday, 9am–6pm)

The CancerLine is staffed by specialist advisors who provide information, practical and emotional support to those affected by cancer. Macmillan's other services include Macmillan nurses and patient grants, as well as access to over 750 cancer self help groups.

Marie Curie Cancer Care

www.mariecurie.org.uk

020 7599 7777 (Monday–Friday, 9am–5pm)

Marie Curie provides specialist palliative nurses and has ten Marie Curie Centres providing free respite and hospice care throughout the UK.

National Cancer Alliance

www.nationalcanceralliance.co.uk

0870 777 7413 (Monday–Friday, 9.30am–4pm)

The NCA is an alliance of cancer patients and healthcare professionals working together to improve the treatment and care of all cancer patients in the UK.

NHS Direct / NHS24

www.nhsdirect.nhs.uk

In England, Northern Ireland and Wales call NHS Direct on 0845 46 47

In Scotland call NHS24 on 08454 24 24 24.

Trained medical professionals provide 24-hour access to information on all aspects of health and healthcare.

Pain Association (Scotland)

www.chronicpaininfo.org

0800 783 6059 (Monday–Friday, 9.30am–4.30pm)

Their helpline offers support to people with chronic pain. They also run pain management support groups across Scotland.

Complementary therapy

Bristol Cancer Help Centre

www.bristolcancerhelp.org

0845 1243 2310 (Monday–Friday, 9.30am–5pm)

A centre offering complementary cancer care to work alongside medical treatment.

The helpline offers information on complementary medicine.

Institute for Complementary Medicine

www.icmedicine.co.uk

0207 237 5165 (Monday–Friday, 10am–3.30pm)

Provides information on registered practitioners of various complementary therapies.

Financial advice

Disability Benefits Enquiry Line

0800 88 22 00 (Monday–Friday, 8.30am–6.30pm; Saturday 9am–1pm)

Offer information about benefits for people with an illness or disability. They provide assistance, over the phone, with filling out benefit application forms.

Citizens Advice Bureau (CAB)

www.nacab.org.uk

Check your local telephone directory for your nearest branch – they offer free, independent and confidential advice about debt and consumer issues, benefits, housing, legal matters and employment. CAB provides assistance to claim welfare benefits, including practical help with filling out benefit application forms.

Carer concerns

Princess Royal Trust for Carers

www.carers.org

0207 480 7788 (Monday - Friday, 9am - 5pm)

This is the largest provider of carers support services in the UK. It provides information, advice and support services and runs a network of 122 independently managed Carers' Centres.

Carers UK

www.carersuk.org.uk

0808 808 7777 (Wednesday and Thursday, 10am–12pm and 2pm–4pm)

Carers UK provide advice, information and support for carers. They have a directory of national and local carers organisations and can signpost you to help in your area.

Crossroads and Macmillan Cancer Relief

www.crossroads.org.uk

0845 450 0350 (Monday–Friday, 9am–5pm)

Crossroads, working with Macmillan Cancer Relief, employ care attendants whose role is to relieve the family carer by giving them a break from their caring responsibilities.

Medical terms explained

Alkylating Agent: A chemotherapeutic agent such as melphalan or cyclophosphamide. Alkylating refers to the way in which these agents cross-link the DNA of myeloma cells and block cell division.

Amyloidosis: A condition in which myeloma light chains (Bence Jones proteins) are deposited in tissues and organs throughout the body. This occurs more commonly with lambda versus kappa Bence Jones proteins. In patients with amyloidosis, the light chain proteins bind to certain tissues such as heart, nerves and kidney rather than being excreted out of the body through the kidneys.

Anaemia: A decrease in the normal number of red blood cells, or the haemoglobin that they contain, usually below 10g/dl with over 13-14g/dl being normal. Myeloma in the bone marrow blocks red cell production, causing shortness of breath, weakness and tiredness.

Angiogenesis: Blood vessel formation, which usually accompanies the growth of malignant tissue, including myeloma.

Antibiotics: Drugs used to treat infection.

Antibody: A protein produced by certain white blood cells (plasma cells) to fight infection and disease in the form of antigens such as bacteria, viruses, toxins, or tumours. Each antibody can bind only to a specific antigen. The purpose of this binding is to help destroy the antigen. Antibodies can work in several ways, depending on the nature of the antigen. Some antibodies disable antigens directly. Others make the antigen more vulnerable to destruction by other white blood cells.

Antigenic: Having the properties of an antigen. Antigens are a vital component of the immune system.

Apoptosis: A normal cellular process involving a genetically programmed series of events leading to the death of a cell.

Aspiration: The process of removing fluid or tissue, or both, from a specific area.

Bence Jones: A myeloma protein present in urine. The amount of Bence Jones protein is expressed in terms of grams per 24 hours. Normally a very small amount of protein (<0.1g/24h) can be present in the urine, but this is albumin rather than Bence Jones protein. The presence of any Bence Jones protein is abnormal.

Beta 2 Microglobulin (β 2M): A small protein found in the blood. High levels occur in patients with active myeloma. Low or normal levels occur in patients with early myeloma and / or inactive disease. Approximately 10% of patients have myeloma that does not produce β 2M. For these patients, β 2M testing cannot be used to monitor the disease. At the time of relapse, β 2M can increase before there is any change in the myeloma protein level. Therefore, 90% of the time, β 2M is very useful for determining disease activity.

Biopsy: The removal of a sample of tissue for microscopic examination to aid in diagnosis

Bisphosphonate: A type of drug that binds to the surface of bone where it is being resorbed (or destroyed) and protects against osteoclast activity. They include clodronate (Bonefos®), pamidronate (Aredia®) and zoledronic acid (Zometa®). In myeloma, they are used to treat bone disease and a high level of calcium in the blood (hypercalcaemia).

Blood cells: Minute structures produced in the bone marrow; they consist of red blood cells, white blood cells, and platelets.

Blood count: The number of red blood cells, white blood cells, and platelets in a sample of blood.

Bone marrow: The soft, spongy tissue in the centre of bones that produces white blood cells, red blood cells, and platelets.

Bone marrow aspiration: The removal, by a needle, of a sample of fluid and cells from the bone marrow for examination under a microscope.

Bone marrow biopsy: The removal, by a needle, of a sample of tissue from the bone. The cells are checked to see whether they are cancerous. If cancerous plasma cells are found, the pathologist estimates how much of the bone marrow is affected. Bone marrow biopsy is usually done at the same time as bone marrow aspiration.

CAT (or CT) scan: A test using Computerised X-rays to create three-dimensional images of organs and structures inside the body, used to detect small areas of bone damage or soft tissue involvement.

Catheter: A tube that is placed in a blood vessel to provide a pathway for drugs or nutrients. A Central Venous Catheter is a special tubing that is surgically inserted into a large vein near the heart and exits from the chest or abdomen. The catheter allows medications, fluids, or blood products to be given and blood samples to be taken.

Cell proliferation: An increase in the number of cells as a result of cell growth and cell division.

Chemotherapy: The treatment of cancer with drugs that kill all rapidly-dividing cells.

Chromosome: A strand of DNA and proteins in the nucleus of a cell. Chromosomes carry genes and function in the transmission of genetic information. Normally, human cells contain 46 chromosomes.

Clinical trial: A research study of new treatment that involves patients. Each study is designed to find better ways to prevent, detect, diagnose, or treat cancer and to answer scientific questions.

Creatinine: A small chemical compound normally excreted by the kidneys. If the kidneys are damaged, the serum level of creatinine builds up, resulting in an elevated serum creatinine. The serum creatinine test is used to measure kidney function.

Cytokine: A substance secreted by cells of the immune system that stimulates growth / activity in a particular type of cell. Cytokines are produced locally (i.e. in the bone marrow) and circulate in the bloodstream.

DEXA Scan: Measures the amount of bone loss; the best measure of bone density.

Dexamethasone: A powerful steroid given alone or with other drugs.

Dialysis: When a patient's kidneys are unable to filter blood, the blood is cleaned by passing it through a dialysis machine.

DNA: Or deoxyribonucleic acid, is the hereditary material in humans and almost all other organisms.

Electrophoresis: A laboratory test in which a patient's serum (blood) or urine molecules are subjected to separation according to their size and electrical charge. For myeloma patients, electrophoresis of the blood or urine allows both the calculation of the amount of myeloma protein (M-protein) as well as the identification of the specific M-spike characteristic for each patient. Electrophoresis is used as a tool both for diagnosis and for monitoring.

Enzyme: A substance that affects the rate at which chemical changes take place in the body.

Erythrocytes: Red blood cells (RBCs). RBCs carry oxygen in the form of haemoglobin to body cells and carbon dioxide away from body cells.

Erythropoietin: A hormone produced by the kidneys. Myeloma patients with damaged kidneys don't produce enough erythropoietin and can become anaemic. Injections with synthetic erythropoietin can be helpful. Blood transfusion is another alternative, especially in an emergency. Synthetic erythropoietin is being used prophylactically before chemotherapy and as a supportive therapy after chemotherapy to avoid anaemia.

Free Light Chains: A portion of the monoclonal protein of light molecular weight that can be measured in a sensitive assay, the Freelite™ test.

Graft-versus-host disease (GvHD): A reaction of donated bone marrow against a patient's own tissue.

Hypercalcaemia: A higher-than-normal level of calcium in the blood. This condition can cause a number of symptoms, including loss of appetite, nausea, thirst, fatigue, muscle weakness, restlessness, and confusion. Common in myeloma patients and usually resulting from bone destruction with release of calcium into the blood stream. Often associated with reduced kidney function since calcium can be toxic to the kidneys. For this reason, hypercalcaemia is usually treated on an emergency basis using IV fluids combined with drugs to reduce bone destruction along with direct treatment for the myeloma.

Informed Consent: The process requiring a doctor to give a patient enough information about a proposed procedure for the patient to make an informed decision about whether or not to undergo it. The doctor must, in addition to explaining all procedures, address the issues of risks, benefits, alternatives, and potential costs.

Interferon: A naturally produced hormone (cytokine) released by the body in response to infection or disease which stimulates the growth of certain disease-fighting blood cells in the immune system. Interferon can be artificially produced by genetic engineering techniques and used as a form of immunotherapy, primarily in the maintenance (plateau) phase to block any regrowth of myeloma and thus delay or prevent relapse.

Lesion: An area of abnormal tissue change. A lump or abscess that may be caused by injury or disease, such as cancer. In myeloma, 'lesion' can refer to a plasmacytoma or a hole in the bone - lytic lesion.

Leukocytes: Cells that help the body fight infections and other diseases. Also called white blood cells (WBCs).

Lymphocytes: White blood cells that fight infection and disease.

Lytic lesions: The damaged area of a bone that shows up as a dark spot on an X-ray when enough of the healthy bone in any one area is eaten away. Lytic lesions look like holes in the bone and are evidence that the bone is being weakened.

M proteins (M spike): Antibodies or parts of antibodies found in unusually large amounts in the blood or urine of multiple myeloma patients. M spike refers to the sharp pattern that occurs on protein electrophoresis when an M protein is present. Synonymous with monoclonal protein and myeloma protein.

MGUS: Monoclonal Gammopathy of Uncertain Significance – MGUS – is a premalignant disorder characterised by the accumulation of plasma cells within the bone marrow and the presence of a monoclonal protein spike on electrophoresis. The feature that distinguishes it from myeloma is the lack of end organ damage. What this means is that there are no lytic bone lesions, no renal damage and no anaemia. The condition is stable but by 10 years of follow up approximately 20% of patients will have progressed to clinical myeloma.

Mini-allogeneic transplant: A type of allogeneic transplant that uses lower doses of chemotherapy than a standard allogeneic transplant, and avoids some of the side-effects and risks associated with higher-dose chemotherapy.

Monoclonal: A clone or duplicate of a single cell. Myeloma develops from a single malignant plasma cell (monoclonal). The type of myeloma protein produced is also monoclonal; a single form rather than many forms (polyclonal). The important practical aspect of a monoclonal protein is that it shows up as a sharp spike (M spike) in the serum electrophoresis test.

Neoplasm: A new growth of tissue or cells; a tumour that can be referred to as benign or malignant.

Neutropenia: A reduced level of neutrophils. Cytotoxic chemotherapy has a tendency to induce neutropenia. In contrast, lymphocytes which are more important in viral infections, tend not to be affected by cytotoxic treatment. Neutropenia can be prevented or reduced using a synthetic hormone called G-CSF (e.g. Neupogen®).

Neutrophils: A type of white blood cell necessary to combat bacterial infection.

Osteoblast: Bone forming cells.

Osteoclast: A cell found in the bone marrow at the junction between the bone marrow and the bone that resorbs or breaks down old bone. In myeloma, the osteoclasts are over-stimulated while osteoblast activity is blocked. The combination of accelerated bone resorption and blocked new bone formation results in lytic lesions.

Osteonecrosis of the jaw: A condition in which the bones of the jaw do not heal properly, causing ongoing, sometimes painful, complications.

Plasma: The liquid part of the blood in which red blood cells, white blood cells, and platelets are suspended.

Plasma cells: Special white blood cells that produce antibodies. The malignant cell in myeloma. Normal plasma cells produce antibodies to fight infection. In myeloma, malignant plasma cells produce large amounts of abnormal antibodies that lack the capability to fight infection. The abnormal antibodies are the monoclonal protein, or M protein. Plasma cells also produce other chemicals that can cause organ and tissue damage (i.e. anaemia, kidney damage, and nerve damage).

Plasmacytoma: A collection of myeloma plasma cells found in a single location rather than diffusely throughout the bone marrow, soft tissue or bone.

Plasmapheresis: The process of removing certain proteins from the blood. Plasmapheresis can be used to remove excess antibodies from the blood of multiple myeloma patients.

Radiation therapy (radiotherapy): Treatment with X-rays, gamma rays, or electrons to damage or kill malignant cells. The radiation may come from outside the body (external radiation) or from radioactive materials placed directly in the tumour (implant radiation).

Revlimid (also known as lenalidomide): Chemically similar to thalidomide, Revlimid is an immunomodulatory drug (IMiD) that works by affecting and modifying the immune system. The exact way in which IMiDs work is not yet fully understood, but like thalidomide, it is thought they have multiple mechanisms of action.

Smouldering myeloma: In this condition there is minimal end organ damage but the level of plasma cells in the bone marrow and the paraprotein level are not stable and are associated with progression towards myeloma. Conventionally, treatment is withheld until there is significant evidence of disease progression.

Stem cells: The immature cells from which all blood cells develop. Normal stem cells give rise to normal blood components, including red cells, white cells, and platelets. Stem cells are normally located in the bone marrow and can be harvested for transplant.

Thrombocytopenia: A low number of platelets in the blood. The normal level is 150,000–250,000. If the platelet count is less than 50,000, bleeding problems could occur. Major bleeding is usually associated with a reduction to less than 10,000.

Velcade (also known as bortezomib): The first of a new type of cancer drugs called proteasome inhibitors. The proteasome is a large structure inside all cells that controls cell growth, and function. It works by breaking down the many different proteins that control the cell's lifecycle. Velcade works by blocking the proteasome, which can lead to slowed cell growth or cell death.

Waldenström's macroglobulinaemia: A rare type of indolent lymphoma that affects plasma cells. Excessive amounts of IgM protein are produced. Not a type of myeloma.

Appendix one: Tests and investigations

Test	Purpose
Bone testing	To assess the presence, severity, and location of any areas of bone damage
X-rays	X-rays are still the gold stanard in searching for myeloma bone damage. A full skeletal survey for myeloma using a series of X-rays is needed to show loss or thinning of bone (osteoporosis or osteopenia caused by myeloma bone destruction), lytic lesions, and / or any fracture or collapse of bone
MRI	Used when X-rays are negative and / or for more detailed testing of particular areas such as spine and / or brain. Can reveal the presence and distribution of disease in the bone marrow when X-rays show no bone damage. Can also reveal disease outside of bone, which may be pressing on nerves and / or spinal cord
CT scan	Used when X-rays are negative and / or for more detailed testing of particular areas. Especially useful for detailed evaluation of small areas of possible bone damage or nerve pressure
Nuclear medicine scans	Routine bone scans used for other cancers. Not useful in myeloma and should not be performed
Whole body FDG / PET scan	A much more sensitive whole body scanning technique currently in clinical trials. Initial results suggest usefulness for disease monitoring, especially for non-secretory disease
Bone density testing	Helpful to assess the severity of diffuse bone loss in myeloma and to measure the serial improvement with bisphosphonate therapy

Test	Purpose
<p>Blood testing</p> <ol style="list-style-type: none"> 1. Complete blood count 2. Urea and electrolytes 3. Special protein testing: <ul style="list-style-type: none"> • Serum protein electrophoresis (SPEP) • Immunofixation • FREELITE™ test 	<ul style="list-style-type: none"> • To assess presence / severity of anaemia • To assess for low white cell count • To assess for low blood platelet count <p>Particularly important to assess kidney function and calcium level</p> <p>This shows the presence of the monoclonal protein myeloma protein (paraprotein)</p> <ul style="list-style-type: none"> • The amount of the abnormal myeloma protein as well as the normal albumin protein level are measured • Shows the type of myeloma protein (i.e. heavy chain [G, A, D or E], light chain, Kappa [K], Lambda [L/λ]) • Can be used to measure the amount of free Kappa or Lambda if no SPEP abnormality discovered
<p>Urine testing</p> <p>Special protein testing as for serum above:</p> <ul style="list-style-type: none"> • Urine Protein Electrophoresis • Immunofixation • FREELITE™ test 	<p>Shows the presence, amount, and type of abnormal myeloma protein in urine (Bence Jones)</p>
<p>Bone marrow biopsy</p>	<p>This is the single most critical test to determine the percentage of myeloma cells in the bone marrow. In Stage I disease or for a solitary plasmacytoma, direct biopsy of the tumour mass is performed</p>
<p>Special tests</p> <p>Can be done to assess prognosis (e.g. chromosomes, immune typing, staining for amyloid)</p>	<p>Chromosome analysis (cytogenetic testing) can reveal good or poor chromosome features using direct and / or FISH analysis</p>

Appendix two: Blood tests

Blood tests	Test name	Normal range*	Units	Notes
Full blood count	White cell count	4.0 - 11.0	$\times 10^9/l$	A low count makes you less able to fight infections
	Red cell count (men)	4.5 - 6.5	$\times 10^{12}/l$	A low count is anaemia, causing fatigue
	Red cell count (women)	3.9 - 5.6	$\times 10^{12}/l$	A low count is anaemia, causing fatigue
	Haemoglobin (men)	13.5 - 18.0	g/dl	A low haemoglobin is also anaemia, causing fatigue
	Haemoglobin (women)	11.5 - 16.0	g/dl	A low haemoglobin is also anaemia, causing fatigue
	Platelets	150 - 400	$\times 10^9/l$	A low count makes you bruise or bleed easily
Urea, electrolytes and creatinine	Urea	2.5 - 6.7	mmol/l	Measure of kidney function
	Creatinine	70 - 150	$\mu\text{mol}/l$	Measure of kidney function
	Calcium (total)	2.12 - 2.65	mmol/l	Raised by myeloma bone disease
Proteins	Albumin	35 - 50	g/l	Often lowered in myeloma because of presence of paraprotein
	Total protein	60 - 80	g/l	Often raised in myeloma because of amount of paraprotein
	Paraprotein	0	g/l	Abnormal protein found in several conditions, including myeloma

* The normal range is an average, but each hospital laboratory has its own 'normal range' of values.

Explanation of units

g/dl how many grammes there are in a decilitre (one tenth of a litre) of blood

g/l how many grammes there are in a litre of blood

$\times 10^9/l$ how many thousand million cells there are in a litre of blood

$\times 10^{12}/l$ how many million million cells there are in a litre of blood

mmol/l how many thousandths of a mole** in a litre of blood

umol/l how many millionths of a mole** there are in a litre of blood

**mole a standard measurement for the amount of any chemical

Please note that doctors do not use a litre of blood to make these measurements; they just take a small sample (a few millilitres) and then multiply the results.

Appendix three: Staging systems

Durie and Salmon Staging System

Criteria Measured myeloma cell mass
(cells x 10¹²/m²)

Stage I (low cell mass) <0.6

All of the following:

- o Haemoglobin value > 10.0g/dl
- o Serum calcium value normal or <2.60 mmol/l
- o Bone X-ray, normal bone structure (scale 0) or solitary bone plasmacytoma only
- o Low M-component production rates
IgG value <50g/l
IgA value <30g/l
Urine light chain M-component on electrophoresis <4g/24h

Stage II (intermediate cell mass) 0.6 - 1.2
Fitting neither stage I nor stage III.

Stage III (high cell mass) >1.2

One or more of the following:

- o Haemoglobin value <8.5g/dl
- o Serum calcium value >3.00mmol/l
- o Advanced lytic bone lesions (scale 3)
- o High M-component production rates
IgG value >70g/l
IgA value >50g/l
Urine light chain M-component on electrophoresis >12g/24h

Subclassification (either A or B)

- o A: relatively normal renal function (serum creatinine value <170umol/l)
- o B: abnormal renal function in mg/dl (serum creatinine value =170umol/l)

International Staging System (ISS)

B2M = serum beta 2 microglobulin

ALB = serum albumin in g/dl

Stage 1 B2M < 3.5

ALB > 3.5

Stage II B2M < 3.5

ALB < 3.5

or B2M 3.5-5.5

Stage III B2M > 5.5

With Myeloma UK you can...

Call our Myeloma Infoline on 0800 980 3332

You will receive immediate access to information and support on all aspects of myeloma. Your call will be answered in confidence by Myeloma Information Nurse Specialists who are supported by medical and scientific advisors. Lines are open Monday to Friday, 9am to 5pm, and are free to phone from anywhere in the UK. From outside the UK call +44 131 557 3332 (charged at normal rate).

Contact us by email

If you have a specific question about any aspect of myeloma, treatment or living with myeloma, you can also contact our Myeloma Information Nurse Specialists by email at askthenurse@myeloma.org.uk

Order our free patient information

Myeloma UK has a range of Essential Guides, Infoguides and Infosheets that give information on myeloma and related disorders, providing details of treatment options and disease management. You will find a list of the information available from us at the back of this guide.

Attend our Patient and Family Myeloma Infodays

These are full-day meetings, where you can learn about the latest in the treatment and management of myeloma from a panel of experts. They are also a valuable opportunity to meet with others affected by myeloma.

Subscribe to *Myeloma Matters*

The only myeloma-specific newsletter available in the UK, *Myeloma Matters* offers a fantastic range of features, articles and stories to help you keep abreast of the latest developments in treatment and research.

Visit our website - www.myeloma.org.uk

Developed to provide immediate, 24-hour access to information about myeloma and related disorders to individuals affected by the disease and people caring for them.

We need your help

Each year, Myeloma UK sends Infoguides and Infosheets to nearly 10,000 patients and their families, and helps thousands more through providing services such as the Myeloma Infoline and Patient and Family Myeloma Infodays.

That is why we need your help

We depend on the support and generous donations from people like you to provide these important services which are available free to myeloma patients, their families and carers.

Will you help us to help others?

- £5 will pay for an Infopack to be sent to help one more patient
- £20 will allow one of our highly trained Myeloma Information Nurse Specialists to help two callers on our Myeloma Infoline
- £50 will pay for a family of three to attend a Myeloma Infoday
- £250 will pay for 2,000 patient information Infosheets

Simply choose the amount that is right for you, or if you prefer, choose an amount of your own. To donate you can either post your donation (by cheque or CAF), use your credit card to donate by telephone or use the Myeloma UK website www.myeloma.org.uk

We can make your money go further if you are a UK taxpayer. If you pay tax at the basic rate we can claim 28p on every pound you donate. For example, if you donate £10 then we are able to claim back £2.80, so your donation becomes £12.80. This extra comes from the taxman and doesn't cost you anything. This process is called Gift Aid.

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Other information available from Myeloma UK

Booklets

Living with Myeloma – Your Essential Guide

Infoguides

Balloon Kyphoplasty
Bone Disease and Bisphosphonates
High-Dose Therapy & Stem Cell Transplantation
Clinical Studies
MRC Myeloma IX
Percutaneous Vertebroplasty
Revlimid
Serum Free Light Chain Assays
Thalidomide
Velcade

Infosheets

Infosheet topics include:
Chemotherapy; Erythropoietin; Fatigue; Growth Factors; Managing Your Finances (including Benefits); Mouthcare; Nutrition / Diet; Radiotherapy; Peripheral Neuropathy; Plasmapheresis; Steroids; Support Groups; The Kidney; Travel Insurance; Travelling

Leaflets

Myeloma – An Introduction

There are a number of conditions closely associated with myeloma. Myeloma UK has information available on AL amyloidosis, Waldenström's Macroglobulinaemia and MGUS.

To order these free publications please contact Myeloma UK.
Myeloma Infoline: 0800 980 3332 (freephone number) or 0131 557 3332
www.myeloma.org.uk email: myelomauk@myeloma.org.uk

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All Myeloma UK publications are extensively reviewed by patients prior to publication. Myeloma UK patient publications are regularly reviewed and revised.

www.myeloma.org.uk
Infoline 0800 980 3332



For more information or to access any of the information and support services listed, contact Myeloma UK

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Annual UK Myeloma Awareness Week 21-28 June