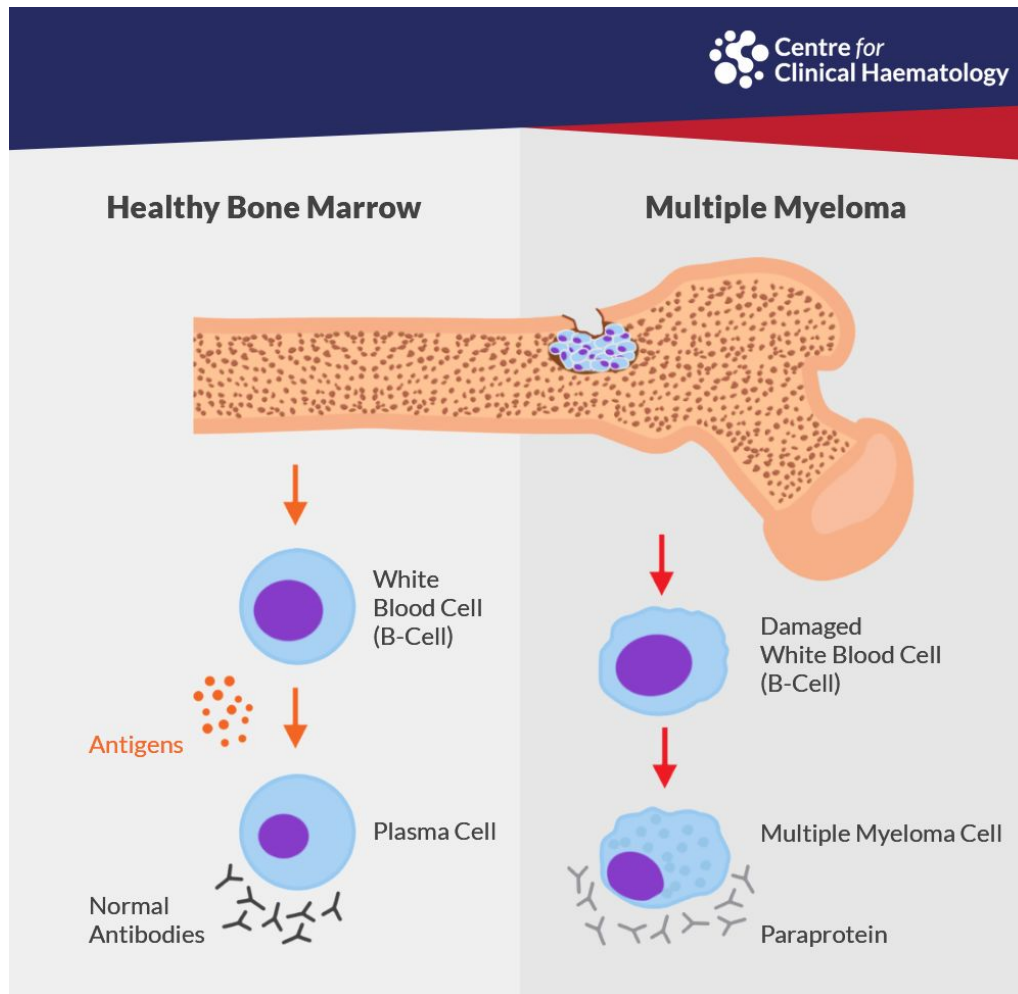


What is Myeloma?

Myeloma is a form of blood cancer that affects the plasma cells in the bone marrow. These cells are normally involved in the defence functions of the immune system and help the body fight infections by producing antibodies.

Myeloma causes accumulation of abnormal plasma cells in the bone marrow resulting in the crowding of healthy blood cells. These cancer cells produce abnormal proteins (called paraproteins) instead of healthy antibodies, thus causing severe complications.



Myeloma affects multiple places in the body, which is why it is sometimes referred to as ‘multiple’ myeloma. Myeloma affects where bone marrow is normally active in an adult, such as in the bones of the spine, skull, pelvis, the rib cage, long bones of the arms and legs and the areas around the shoulders and hips.

What are the risk factors for Myeloma?

Several factors can increase your risk of myeloma, including:

- **Age, Race, and Gender**
The risk of Myeloma increases with age. It is twice as common in individuals of African origin than of Asian and Caucasian origins. The incidence of this disease is 1.5 times higher in men than in women.
- **Family History**
People having a parent, sibling, or child with Myeloma are nearly two times more likely to develop it compared to the general population.
- **Personal History**
A history of MGUS (monoclonal gammopathy of undetermined significance) can increase the risk of myeloma.
- **Exposure to toxic elements**
Repeated exposure to toxic elements such as radiation, agricultural chemicals, and petrochemicals increases the risk of Myeloma.
- **Obesity**
Obesity is a common risk factor for several forms of cancers, including Myeloma.

What are the symptoms of Myeloma?

The common signs and symptoms of Myeloma include:

- Pain in the bones, particularly the spine and ribs
- Unusual tiredness
- Recurring infections
- Mental disorientation, fogginess, and confusion
- Kidney damage
- Unexplained weight loss
- Numbness or weakness in the legs
- Increased thirst

What are the complications of Myeloma?

- **Frequent infections.** Myeloma cells stop your body from fighting infections effectively.
- **Bone Damage.** Myeloma cells can interfere with the normal process of bone maintenance and cause bone problems such as bone pain, thin and broken bones.
- **Higher calcium levels** in the blood related to eroding bones. The symptoms of high calcium are thirst, nausea, vomiting, confusion and constipation.
- **Kidney damage.** The abnormal protein produced by myeloma cells can damage the kidneys, as can high calcium levels.
- **Low red blood cell count (anaemia).** As myeloma cells result in the crowding of healthy blood cells, it can also cause anaemia and other blood problems.

How is Myeloma diagnosed?

Tests and procedures that can help in the diagnosis of multiple myeloma include:

- **Blood tests**

Myeloma causes high levels of some proteins in the blood. Blood tests to examine the levels of different proteins such as M protein, serum-free light chains, beta-2-microglobulin (β 2M), albumin, and immunoglobulins can help in the diagnosis of myeloma.

β 2M is one of the important indicators of the activity and extent of myeloma in the blood. Blood tests to assess your kidney functions, blood cell counts, uric acid and calcium levels can also help with the diagnosis.
- **Urine tests**

A urine sample can be taken to check for myeloma proteins, which are referred to as Bence Jones proteins when they are passed in the urine.
- **Imaging Tests**

A skeletal survey that includes a series of X-rays of the long bones, skull, and spine can help to detect myeloma. X-rays can also help to identify the specific areas of bone damage that have caused the collapse or fracture, which require immediate attention. Other imaging tests such as PET-computerized tomography (PET-CT) scans and magnetic resonance imaging (MRI) can be performed to identify areas of bone damage that are not easily detected by X-rays.
- **Bone marrow tests**

Bone marrow tests are essential for determining the amount and presence of myeloma cells in your bone marrow in proportion to other blood cells.

Treatments for Myeloma

There are two goals of the treatment for Myeloma:

- To bring the Myeloma into remission
- To improve the patient's quality of life by relieving the symptoms and preventing complications associated with Myeloma such as bone pain and anaemia.

If you are not experiencing any symptoms, you may not require treatment. However, the doctor will monitor your condition regularly for signs of disease progression. This may involve regular blood and urine tests.

Treatment Options

Most patients with Myeloma are given a combination of drugs and treatment. The choice of drugs depends on the patient's physical status, including age and overall health, the extent of renal impairment or organ damage, and the specific sub-type of Myeloma.

Treatment options include:

Chemotherapy

Chemotherapeutic drugs can destroy fast-growing cancer cells in patients with myeloma. **Chemotherapy** drugs can be taken orally as pills or administered as an injection into a vein in your arm. Higher doses of chemotherapy drugs can be used prior to a bone marrow transplant.

Corticosteroids

Prednisone and dexamethasone are commonly used corticosteroids for regulating the immune system functions and controlling inflammation in the body. Steroids have anti-myeloma effects, as they can trigger the death of myeloma cells. Corticosteroids can be taken orally in pill form or administered intravenously in your arm.

Immunotherapy

Immunotherapy works by stimulating your immune system to fight against myeloma cells. Immunomodulating drugs commonly used for myeloma include Thalidomide, Lenalidomide, and Pomalidomide.

Targeted therapy

This treatment targets specific abnormalities in cancer cells which enable them to survive. It involves the use of Proteasome Inhibitors such as Bortezomib that can inhibit the action of substances in myeloma cells which break down proteins. This causes myeloma cells to die.

The use of monoclonal antibodies, such as Elotuzumab and Daratumumab allow immune cells to identify and attack myeloma cells more efficiently.

Stem Cell Transplant

A **stem cell transplant** involves the replacement of diseased bone marrow with healthy bone marrow. In most cases, the patient's stem cells are transplanted. Healthy blood-forming stem cells are collected from the blood and stored in advance of the transplantation. For the actual transplantation, high doses of chemotherapy drugs are then given to destroy the diseased bone marrow. The collected stem cells are then infused back into the blood and travel to the bones to rebuild healthy bone marrow.

Radiation therapy

This treatment involves the use of beams of energy, such as protons and X-rays, to destroy myeloma cells and prevent their growth. Radiation therapy would shrink myeloma cells quickly in a specific area. Radiation therapy is effective at alleviating bone pain and disease due to myeloma. It is also effective for treating a tumour called plasmacytoma caused by the collection of abnormal plasma cells.

Treating complications

In addition to treating myeloma, the doctor may also need to treat the complications of myeloma.

- **Bone pain.** Pain relief medication, radiation therapy and surgery may alleviate bone pain.
- **Bone loss.** The doctor may recommend medications called bisphosphonates, such as pamidronate or zoledronic acid. These help to prevent bone loss.
- **Kidney complications.** Dialysis may be required for people with severe kidney failure.
- **Infections.** Certain vaccines may be recommended to prevent infections such as the flu and pneumonia vaccinations.
- **Anaemia.** If the anaemia is persistent and severe, medication such as erythropoietin, or blood transfusions may be given to increase the red blood cell count.

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