

# Multiple Myeloma:

## What You Need to Know About Treatment and Side Effects

### What is multiple myeloma?

Multiple myeloma (MM) is a type of cancer that affects the plasma cells in your bone marrow (the inside part of the bone). The bone marrow is where all of your blood cells grow, including a type called plasma cells. Plasma cells normally help fight infections and other diseases. When plasma cells become cancerous, they grow out of control and can hurt your body in several key ways:

- They grow faster than other cells in the bone marrow and crowd out healthy cells, which can cause anemia or make you bleed easier (because your platelet count may be low)
- They block signals that tell other cells in the marrow to build new bone tissue; this makes your bones more prone to fractures
- They cause damage to the bone and the development of “soft spots” where the bone is damaged
- They can turn into tumors in the bone marrow and can spread to other organs

- They do not help fight infection like healthy cells do, so you may get infections more easily than other people
- They make an abnormal protein (called *monoclonal*, or *M, protein*) that can hurt your kidneys

### How did I get MM?

No one knows how MM develops. Smoking, being overweight, and being older all increase the risk of getting MM, but people without any risk factors can also get it. More African Americans than Caucasians get MM.

### How is MM treated?

There are many ways to treat MM. The goal is to kill cancer cells, and each type of treatment does that in a different way. Some of the medications that are commonly used long-term to treat MM are listed in the tables below:

TYPE OF MEDICATION	EXAMPLE	HOW IT WORKS
<b>Immunomodulating agents</b>	Revlimid (lenalidomide) Pomalyst (pomalidomide) Thalomid (thalidomide)	Increases the body's immune response, which slows down or kills cancer cells
<b>Proteasome inhibitors</b>	Velcade (bortezomib) Kyprolis (carfilzomib)	Keeps cancer cells from breaking down and reusing proteins that they need to stay alive
<b>Chemotherapy</b>	Doxil (doxorubicin HCL liposome) Alkeran (melphalan) Cytosan (cyclophosphamide) Adriamycin (doxorubicin)	Changes cancer cells to prevent them from making more cells
<b>Corticosteroids</b>	Decadron (dexamethasone)	Reduces swelling to relieve pain; high doses help kill myeloma cells

OTHER TYPE OF TREATMENT	HOW IT WORKS
<b>Bisphosphonates</b> • Aredia (pamidronate) • Zometa (zoledronic acid)	Helps heal damage to bones caused by cancer
<b>Radiation therapy</b>	Puts high-energy beams or particles into tissues to destroy tumors; it can be given in high, low, or total-body doses • <b>High- and low-dose</b> radiation are used to treat the tumors and control the disease • <b>Total-body</b> radiation is given to prepare for a stem cell transplant
<b>Stem cell transplants</b>	Uses your own stem cells or someone else's stem cells to replace the bone marrow cells that were damaged during treatment
<b>Surgery</b>	Removes tumors that are in parts of the body besides the bone or may stabilize the spine

## What treatment is best for me?

The best treatment depends on many factors, such as:

- Your age
- Your general health
- Any other diseases you might have
- The results of your lab tests
- Your preference, based on your daily activities
- How aggressive your MM is
- The risk of side effects
- Your response to previous treatment(s)

Your doctor will discuss all of your options with you and you will figure out the best treatment together.

Doctors often prescribe multiple treatments to patients. This is called combination therapy. Combination therapy is commonly used for your first MM treatment, if stem cell treatment is planned, or to prevent the cancer from coming back after successful treatments.

## What other treatments will I need to know about while I'm on MM therapy?

MM treatment is about more than just killing cancer cells. Some other treatments can be given to help you live the way you want to live and do what you want to do. These types of treatments are called supportive therapies, and they do two main things:

- Control and lessen medication side effects
- Avoid potential disease complications

The most commonly used supportive MM therapies include:

- **Growth factors** (to help the body make more red blood cells and/or white blood cells, to fix anemia, and to lessen mouth sores)
- **Antibiotics** (to prevent infections)
- **Pain medication** (to help with numbness, tingling, and burning feelings in hands and feet and to help with injection pain)
- **Antithrombotics** (to prevent blood clots)
- **Antivirals** (to prevent shingles, a common complication of some MM medications)
- **Steroids** (to reduce body-wide inflammation and kill cancer cells; they can also lessen the pain and nausea that you may get with other treatments)
- **Plasmapheresis** (to take out certain bad proteins from the blood and to help your kidneys)
- **Orthopedic surgery** (to help with pain and movement and to fix fractures)

## Will treatment cure me?

MM is an incurable cancer, but some patients may go long periods where they are symptom free. Although you may be able to stop treatment for a little while, regular follow-up and treatments are necessary. The main goals of all treatments are to:

- Control the disease to prevent damage to other organs
- Make sure your quality of life is good and you that can do your normal activities
- Lessen disease symptoms and side effects

## How will I know if a treatment is working?

Your doctor may use any of the following tests or tools to keep track of your MM:

- Urine and blood tests for M protein and immunoglobulin light chains
- Blood tests to check cell counts and kidney and liver functions
- X-rays to check for bone damage or fractures
- Other imaging studies if needed
- Bone-marrow biopsy to check your plasma cell counts

Results from these tests—as well as information you give about how you're feeling and any symptoms you're having—will help your doctor monitor your MM.

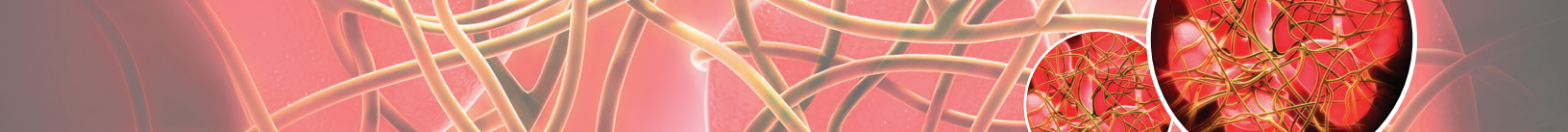
## Are there risks and side effects of MM treatment?

All of the medications used to treat MM have side effects (which are mild but often bothersome) and risks (which are rare but more serious). Some side effects can be treated with other medications; others just have to be tolerated, but they may get better over time.

It is important to be aware of any side effects that develop and to discuss these with your doctor. You may need to add a medication to address the side effects or, in some cases, stop taking the medication that is causing the side effects.

## What are the most common side effects?

Each type of MM medication causes certain side effects. Many of them cause nausea, vomiting, diarrhea, and/or constipation. Tiredness or fatigue is another common problem. The following table lists the most common side effects for each type of MM medication:



TYPE OF MEDICATION	MEDICATION NAME	MOST COMMON SIDE EFFECTS	
<b>Immunomodulating agents</b>	Pomalyst (pomalidomide) Thalomid (thalidomide)	Nausea/vomiting Tiredness/fatigue Constipation	Low white blood cell count Nerve pain Blood clots
	Revlimid (lenalidomide)	Infection Nausea/vomiting	Constipation Blood clots
<b>Proteasome inhibitors</b>	Velcade (bortezomib)	Nausea/vomiting Tiredness/fatigue Diarrhea Constipation	Low platelet count Low white blood cell count Nerve tingling or pain
	Kyprolis (carfilzomib)	Shortness of breath Tiredness/fatigue Flu-like symptoms Low platelet count	Low white blood cell count Nausea/vomiting Diarrhea Heart problems
<b>Chemotherapy</b>	Doxil (doxorubicin HCL liposome) Alkeran (melphalan) Cytosan (cyclophosphamide) Adriamycin (doxorubicin)	Nausea/vomiting Low blood cell count Tiredness/fatigue Mouth sores	Diarrhea Hair loss Kidney problems Heart problems
<b>Bisphosphonates</b>	Aredia (pamidronate) Zometa (zoledronic acid)	Fever Flu-like symptoms Bone, muscle, or joint pain Nausea/vomiting Headache	Kidney problems Damage to the bone, which can lead to infection (often in the jaw)

## What are the more serious possible risks of MM medications?

**Low Blood Cell Counts.** Low blood cell counts are very common during MM treatment; this can be dangerous because having a low number of blood cells—especially white blood cells—can lead to infection. Your doctor will ask you to get regular blood draws to monitor your blood cell counts. Also, if you develop a fever or flu-like symptoms, you should let your doctor know—it could be a sign of infection. Your doctor may add another medication to try to fight the infection or adjust or stop your MM medications for a short time.

Many patients experience low red blood cell counts, which is called anemia. Anemia can usually be treated with medication or by adding foods or vitamins to your diet that are high in iron. Another problem that some people with MM can develop is a shortage of platelets in the blood, which can cause bruising or bleeding that takes a long time to stop.

In severe cases, patients with one or more of these types of low blood cell counts may require a blood transfusion.

**Nerve Pain.** Feeling nerve numbness, tingling, or pain is a common side effect of MM treatments. This condition is called *peripheral neuropathy* (PN) and is felt most commonly in the hands or feet. PN is very common in patients who take Thalomid (thalidomide), relatively common in those who take Velcade (bortezomib), and less common in those who take the other MM drugs. It can be very painful and disruptive to day-to-day life, so it is important to identify PN before it gets worse. In some cases, your doctor will prescribe oral medication or a pain-relief patch to reduce the pain.

**Blood Clots.** Patients who take Pomalyst (pomalidomide), Thalomid (thalidomide), or Revlimid (lenalidomide) can develop blood clots. Being overweight or inactive are other contributing factors. Patients who are at risk of developing a blood clot may take a medication called an *anticoagulant*, such as aspirin or the prescription drugs heparin and warfarin. Blood clots are difficult for patients to detect themselves, but you should call your doctor immediately if you notice an area of your body that feels unusually warm, tender, or painful to touch or is red or otherwise discolored.

If you experience unexplained swelling (which usually occurs in the leg), shortness of breath, or chest pains, call 911.

**Jaw Infections.** Patients who take bisphosphonates, such as Aredia (pamidronate) or Zometa (zoledronic acid), to help heal and rebuild bone have a risk of developing a jaw infection called *osteonecrosis of the jaw* (ONJ). This condition occurs when the gums in your mouth no longer cover the entire jaw, and part of the jaw bone is exposed. It is more common in people who have been taking bisphosphonates for a longer period of time. Mouth pain and infection are common signs of ONJ. It is usually treated with pain medications and antibiotics.

## How can I avoid medication side effects and risks?

Being aware of the possible side effects is a great first step. Now that you know what to watch for, you should keep track of any side effects that occur and let your doctor know. For mild but bothersome side effects, like nausea or tiredness, you can tell your doctor at your next clinic visit. For more serious side effects, you should call your doctor as soon as possible or, in some cases, go to the emergency room.

Some people find it helpful to keep a journal of their symptoms and side effects that they can share with their doctor at each visit. You could use a chart like the example below:

SYMPTOM/SIDE EFFECT	DATE AND TIME	HOW MUCH DID IT BOTHER YOU? (1 = NOT MUCH, 10 = VERY MUCH)
Nausea	6/12/14 from 9 am - 12 pm	4 or 5
Nausea	6/13/14 from 9 am - 10 am	9 (I vomited)

## Where can I find resources about MM?

The following Web sites are great places to go to look for more information about MM:

- The Multiple Myeloma Research Foundation ([www.themmr.org](http://www.themmr.org))
- International Myeloma Foundation ([www.myeloma.org](http://www.myeloma.org))
- Leukemia and Lymphoma Society ([www.lls.org](http://www.lls.org))
- National Cancer Institute ([www.cancer.gov](http://www.cancer.gov))
- American Cancer Society ([www.cancer.org](http://www.cancer.org))