Types of Cancer

# Multiple Myeloma

What is multiple myeloma?

Multiple myeloma is an uncommon type of blood cancer that affects the bone marrow, where new blood cells are produced. It occurs when the body makes too many plasma cells, a type of white blood cell. Thanks to more effective treatments, the duration of myeloma remission is increasing and survival is improving.

Plasma cells are mature B cells that produce antibodies. In people with multiple myeloma, abnormal plasma cells multiply in the bone marrow and make abnormal antibodies called M proteins, which can build up in the blood and organs. These abnormal plasma cells can clump together to form tumors in bones or soft tissue, and they can crowd out normal blood-forming cells. This can lead to bone fractures, low blood counts and increased risk of infection; over time the disease can damage the kidneys and other organs.

Who gets multiple myeloma?

About 32,000 people will develop multiple myeloma and nearly 13,000 people will die from it in the United States this year, according to the American Cancer Society. Men are slightly more likely than women to develop multiple myeloma, and it is more common among African Americans compared with other racial and ethnic groups. Most people diagnosed with multiple myeloma are age 65 or older.

What are the risk factors for multiple myeloma?

Multiple myeloma runs in families, but most people the disease don’t have affected family members. Radiation exposure is a known risk factor. Some research suggests that being overweight and exposure to certain chemicals may increase the risk. Excessive productive of a cell signaling molecule called interleukin-6 can trigger the development of plasma cell tumors.

What are the symptoms of multiple myeloma?

B-cells are white blood cells that produce antibodies to fight infections. Having abnormal antibodies increases the risk of infection, and multiple myeloma tumors in the bone marrow can interfere with production of other types of blood cells. Symptoms may include the following:

- Bone pain, often in the back, hips or skull

- Bone loss (osteoporosis) and easy fractures
- Low red blood cell count (anemia)
- Low white blood cell count (leukopenia and neutropenia)
- Low platelets (thrombocytopenia), leading to easy bruising and bleeding
- Fatigue
- Frequent infections
- High blood calcium level
- Feeling very thirsty
- Frequent urination
- Constipation
- Feeling drowsy or confused
- Muscle weakness or numbness

How is multiple myeloma diagnosed?

The process of diagnosing multiple myeloma starts with a physical exam and health history. Blood tests are done to look for abnormal cells, low blood cell counts and abnormal levels of minerals like iron and calcium. Abnormal antibodies can raise the total blood protein level, which is often how myeloma is first detected. A steep rise in a specific monoclonal, or M, protein is called an M spike.

Some people first develop smoldering myeloma (monoclonal gammopathy of undetermined significance), an asymptomatic precursor condition characterized by elevated M proteins and a higher than normal percentage of plasma cells in the bone marrow.

X-rays, MRIs and other scans may be done to look for multiple myeloma tumors in bones or areas of bone loss. A bone marrow biopsy may be done, in which a needle is used to remove a small sample to examine in the laboratory.

How is multiple myeloma treated?

Treatment for multiple myeloma depends on how advanced it is, how much it has spread and what symptoms are present. In many cases, different types of treatment are used in combination, for example chemotherapy plus an immunomodulator and a targeted therapy. Surgery and radiation are not usually used to treat multiple myeloma, but they may help relieve symptoms such as bone pain.

Watchful waiting: For people with smoldering myeloma or early-stage disease, regular monitoring without treatment may be an option. Treatment usually starts when blood cell counts become too

abnormal.

Chemotherapy: Traditional chemotherapy works by killing fast-growing cells, including cancer cells. It can also harm rapidly dividing healthy cells, which can lead to side effects. Common chemotherapy medications for myeloma include cyclophosphamide, doxorubicin and melphalan. Chemotherapy may be used with corticosteroids to help it work better and reduce side effects.

Immunotherapy: This type of treatment helps the immune system fight cancer. The FDA-approved immunomodulators Pomalyst (pomalidomide), Revlimid (lenalidomide) and Thalomid (thalidomide) boost immune activity and inhibit the growth of myeloma cells and blood vessels that supply the cancer. A new type of immunotherapy, chimeric antigen receptor T cell (CAR-T) therapy, which genetically reprograms immune cells to fight cancer, has shown promise for multiple myeloma.

Targeted therapy: Targeted drugs work against cancer with specific characteristics. Approved medications for myeloma include the proteasome inhibitors Kyprolis (carfilzomib), Ninlaro (ixazomib) and Velcade (bortezomib), which stop the breakdown of excess proteins in cancer cells; the monoclonal antibodies Darzalex (daratumumab) and Empliciti (elotuzumab), which help immune cells recognize and attack the cancer; and Farydak (panobinostat), which activates genes that control cancer growth.

Stem cell transplant: Bone marrow contains stem cells that give rise to all types of blood cells. A patient’s cancerous blood cells may be destroyed with strong chemotherapy and replaced with either preserved stem cells from the same person or bone marrow from a donor.

Surgery and radiation: These approaches are not usually used to treat multiple myeloma, but they may help relieve symptoms such as bone pain.

Bone medications: Additional medications may be used to strengthen the bones and prevent fractures include Xgeva (denosumab) and bisphosphonates such as Aredia (pamidronate) and Zometa (zoledronic acid).

Click here for a list of approved medications used to treat multiple myeloma.

For more information on multiple myeloma, visit:

American Cancer Society

National Cancer Institute

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