Multiple Myeloma - Diagnosis [1]

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ON THIS PAGE: You will find a list of the common tests, procedures, and scans that doctors can use to find out what?s wrong and identify the cause of the problem. To see other pages, use the menu on the side of your screen.

Doctors use many tests to diagnose cancer and find out if it has spread to another part of the body, called metastasis. Some tests may also determine which treatments may be the most effective. For most types of cancer, a biopsy is the only way to make a definitive diagnosis of cancer. If a biopsy is not possible, the doctor may suggest other tests that will help make a diagnosis. Imaging tests may be used to find out whether the cancer has spread.

This list describes options for diagnosing this type of cancer, and not all tests listed will be used for every person. Your doctor may consider these factors when choosing a diagnostic test:

- Age and medical condition
- Type of cancer suspected
- Signs and symptoms
- Previous test results

The following tests may be used to diagnose multiple myeloma:

- **Blood and urine tests.** Myeloma cells often secrete the antibody monoclonal immunoglobulin known as ?M protein?. Levels of ?M protein? in a patient's blood and urine are used to determine the extent of the disease and to monitor the effectiveness of treatment. In some patients, the myeloma cells only secrete part of the antibody, which is called the light chain.

  Serum protein electrophoresis (SPE) or urine protein electrophoresis (UPE) helps identify and measure how

much (quantify) "M protein" is in the blood or urine. These tests help to see if the treatment is working and whether the disease is progressing or coming back.

Quantitative immunoglobulin levels in blood help to quantify the amount of antibody levels in the blood: immunoglobulin G (IgG), immunoglobulin A (IgA) and immunoglobulin M (IgM). In multiple myeloma, when cancer protein level is up, the normal antibody levels are down.

Free light chains can be quantified in the blood before the filtering action of the kidneys. This test is called a serum free light chain assay. This is a more sensitive test than measuring urine M spike, also known as Bence Jones protein, in the urine.

The levels of serum albumin and serum beta 2-microglobulin are measured using blood tests. Serum albumin is a blood protein made by the liver that is necessary for maintaining proper blood volume. (Serum beta 2-microglobulin, or ?2-M, is a small protein that plays a role in immunologic defense.) These results are important for determining the stage [3] of the cancer. Blood tests are also used to measure kidney function, calcium levels, and blood cell counts [4] for possible anemia.

- **X-ray.** An x-ray is a way to create a picture of the structures inside of your body using a small amount of radiation. X-rays are typically the first step in evaluating bones when myeloma is suspected or diagnosed.

- **Magnetic resonance imaging (MRI)** [5]**.** An MRI uses magnetic fields, not x-rays, to produce detailed images of the body. An MRI can show replacement of normal bone marrow by myeloma cells or plasmacytoma (a plasma cell tumor growing in bone or soft tissue), especially in the skull, spine, and pelvis. The detailed images may also show compression fractures of the spine or a tumor pressing on nerve roots. MRI can also be used to measure the tumor?s size.

- **Computed tomography (CT or CAT) scan** [6]**.** A CT scan creates a detailed, cross-sectional view that shows any abnormalities or tumors in soft tissues. A computer then combines these images into a three-dimensional picture of the inside of the body. It is important to note that, intravenous contrast dye often used for CT scans for other types of cancer is specifically avoided in patients with multiple myeloma. Please tell the radiologist or the radiology technician about your diagnosis before receiving dye injection into your vein.

- **Positron emission tomography (PET) scan** [7]**.** A PET scan is a way to create pictures of organs and tissues inside the body. A small amount of a radioactive sugar substance is injected into the patient?s body. This sugar substance is taken up by cells that use the most energy. Because cancer tends to use energy actively, it absorbs more of the radioactive substance. A scanner then detects this substance to produce images of the inside of the body.

- **Integrated PET-CT scan** [8]**.** An integrated PET-CT scan combines the images from a positron emission tomography (PET) scan and a computed tomography (CT) scan, performed at the same time on the same machine. Together, the two scans create a more complete image than either test can offer alone.

- **Bone marrow aspiration and biopsy** [9]**.** These two procedures are similar and often done at the same time to examine the bone marrow. Bone marrow has both a solid and a liquid part. A bone marrow

aspiration removes a sample of the fluid with a needle. A bone marrow biopsy is the removal of a small amount of solid tissue using a needle, and it is important to making a diagnosis of myeloma.

A pathologist then analyzes the sample(s). A pathologist is a doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease.
A common site for a bone marrow aspiration and biopsy is the pelvic bone, which is located in the lower back by the hip. The skin in that area is numbed with medication beforehand, and other types of anesthesia (medication to block the awareness of pain) may be used.

- **Fat pad aspirate.** If certain ?M proteins? that are misfolded in a particular way are deposited in body tissues, it can cause organ dysfunction. This condition is called amyloidosis [10]. If amyloidosis is a consideration, it may be necessary to take a sample of the abdominal fat pad (the collection of fat around a person's abdomen) for examination under a microscope, called a biopsy [11].

- **Molecular testing of the tumor**. Your doctor may recommend running laboratory tests on a tumor sample to identify specific chromosomes (cytogenetics), genes (FISH ? **F**luorescent **I**n **S**itu **H**ybridazation), proteins, and other factors unique to the tumor. Results of these tests may help guide your treatment options (see the Treatment Options [12] section more details).

After diagnostic tests are done, your doctor will review all of the results with you. If the diagnosis is cancer, these results also help the doctor describe the cancer; this is called staging.

The next section in this guide is Stages [3]*, and it explains the system doctors use to describe the extent of the disease. Or, use the menu on the side of your screen to choose another section to continue reading this guide.*

Links:
[1] http://www.cancer.net/cancer-types/multiple-myeloma/diagnosis
[2] http://www.cancer.net/about-us
[3] http://www.cancer.net/node/19373
[4] http://www.cancer.net/node/24716
[5] http://www.cancer.net/node/24578
[6] http://www.cancer.net/node/24486
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[12] http://www.cancer.net/node/19374