



## Myeloma Kidney

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### What is Multiple Myeloma?

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Multiple Myeloma is a type of blood cancer that affects the plasma cells. Plasma cells are immune cells that normally make special proteins, called antibodies, to fight off disease. These antibodies are part of the body's defense system to neutralize infections that invade the blood stream. Patients who have multiple myeloma make plasma cells that are abnormal. These plasma cells do not make normal antibodies anymore, but instead make too much of one kind of protein. When this happens, the levels of these proteins in the blood become higher than normal.

These abnormal proteins can cause bad things to happen throughout the body. The abnormal plasma cells and the abnormal proteins that they make are what cause the major symptoms of multiple myeloma: bone disease, anemia, renal failure, increased risk of infection, and high levels of calcium. This page will focus on the kidney failure that can happen in patients with multiple myeloma.

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### What is Myeloma Kidney?

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Kidney failure is a common complication of multiple myeloma. When first diagnosed, as many as 20-40% of patients with multiple myeloma will have some amount of kidney failure. Multiple myeloma can affect the kidney in several ways. It can affect the filter ([glomerulus](#)), the tubules (pipes), or the tissue of the kidney itself (interstitium). The effect of multiple myeloma on the glomerulus (filter) due to light chain, heavy chain deposition, and amyloidosis will be reviewed on this web site under those specific topics. This page is going to focus on the affect of multiple myeloma on the tubules of the kidney, commonly referred to as myeloma kidney. It is also known as cast nephropathy.

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### How does Multiple Myeloma affect the kidneys?

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The tubules are the pipes through which filtered blood ultimately becomes urine and exits the body as waste. The kidney has many filters, which we call glomeruli. The blood passes through the glomeruli and then enters the tubules (pipes). The abnormal proteins that are made by the plasma cells in patients with multiple myeloma float around in the blood stream. The blood passes through the filters in the kidneys and these abnormal proteins enter the tubules. These abnormal proteins then travel through the tubules and can join up with another type of protein normally present in the urine, Tamm Horsfall protein. If these two proteins join together they become too big to pass on through the tubules and therefore cannot exit the kidney in the form of urine. This combination of proteins results in large casts that block the tubules inside the kidney. These tubules are just like pipes that carry water, when they get blocked fluid cannot flow through. These blockages lead to kidney damage.

In addition to blockages, these casts cause an inflammatory reaction in the tissue of the kidney around them. When kidney failure occurs due to these blockages, we call this cast nephropathy or myeloma kidney.

The tubules of the kidney can also be damaged simply due to the toxic effects of these filtered proteins. This can lead to abnormal kidney function even in the absence of cast formation. However, myeloma kidney is by far the most common manifestation of kidney disease in patients with multiple myeloma.

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### What does it look like (under the microscope)?

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To determine why the kidney is failing we often need to get a biopsy of the kidney to look up close at the glomeruli and the tubules. When someone has cast myeloma kidney, you can see the tubules full of proteins that blocks the inside of the tubule.

The glomeruli (filters) of the kidney are typically not affected in cast nephropathy and usually appear normal.

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### How did I get it?

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Multiple myeloma is a type of blood cancer and we do not know exactly why people get it. It is a rare disease and affects only about 1 in 4,000 people. Each year about 13,000-20,000 people will be diagnosed with this disease.

There are some studies that show people who have been exposed to certain toxins like radiation, benzene, herbicides, insecticides, and organic solvents are more at risk than the general population. However, many people develop multiple myeloma without any exposure to these agents. Typically the age at which people are most likely to be diagnosed with multiple myeloma is in their 50s and 60s.

We often do not know why people develop this disease and it is not possible to predict who will develop it. In order to get myeloma kidney, you must have multiple myeloma.

Not all patients with multiple myeloma will develop myeloma kidney, generally about 30-50% of patients develop this problem. There are things that will make a patient with multiple myeloma more at risk to develop myeloma kidney. Dehydration, therapy with furosemide (a fluid pill), high blood levels of calcium, and high levels of sodium in the urine all can lead to increased formation of these casts.

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### What are the symptoms?

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The symptoms of multiple myeloma are typically fatigue, bone pain, and infections. This is because multiple myeloma causes anemia, destruction of the bones, and decreased production of normal antibodies (proteins) that fight infection. The destruction of the bones due to multiple myeloma can often lead to fractures of the bone that occur with little or sometimes no trauma. Often, though, the signs of kidney dysfunction will be first discovered on lab work done for another medical reason.

Lab results could show increased level of creatinine, or increased amount of protein in the urine. People who develop advanced kidney disease will have symptoms related to kidney failure including nausea, itching, confusion, and fatigue.

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### How is it diagnosed?

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In order to diagnose myeloma kidney, a biopsy needs to be done. However, there are other tests that need to be done to diagnose multiple myeloma. These include blood tests, urine tests, x-rays of the bones, and a bone marrow biopsy. The blood tests and urine tests can detect the abnormal proteins that are made by the plasma cells. The x-rays of the bones look for lesions in the bones caused by the multiple myeloma. The bone marrow biopsy will find the abnormal plasma cells inside the bones.

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## What is the treatment?

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The treatment for the kidney disease associated with multiple myeloma depends upon treating the myeloma itself. Patients with multiple myeloma are treated with chemotherapy and/or bone marrow transplant. Bone marrow transplant is only for patients who have good mobility and function and do not have severe kidney, liver, or heart disease. For chemotherapy, the most common regimen involves a combination of prednisone, thalidomide, and melphalan. Chemotherapy can help reduce the production of the abnormal proteins by the plasma cells, which is very important for patients with myeloma kidney. By reducing the abnormal protein in the blood, the kidney will have a chance to recover.

In addition to chemotherapy to treat the multiple myeloma, there are a few other things that can help patients with myeloma kidney. Keeping hydrated is very important, because being dehydrated can lead to more cast formation. Therefore, drinking 2-3L of water a day is recommended. Avoiding NSAIDs (like ibuprofen) and diuretics (like furosemide) are important because these medications cause more cast formation. Treating high blood levels of calcium is important so that the high calcium levels do not filter through the kidney and make cast formation worse. High calcium levels are usually treated with medications such as pamidronate and zoledronic acid. Finally, patients with multiple myeloma and especially those with myeloma kidney should not get IV contrast.

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## What are the chances that I will get better?

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The prognosis for multiple myeloma depends in large part on if the kidney is affected and how badly. Patients who have kidney dysfunction will have an average survival of 20 months (slightly less than 2 years). Those patients without kidney dysfunction will have an average survival of 40 months (between 3 and 4 years). Among all patients, response to chemotherapy is very important as well. Patients whose kidney function improves with chemotherapy have an average survival of 3 years. Those patients whose kidney function does not improve with chemotherapy will only live an average of 10 months.



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