



Membranous Nephropathy

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What is Membranous Nephropathy?

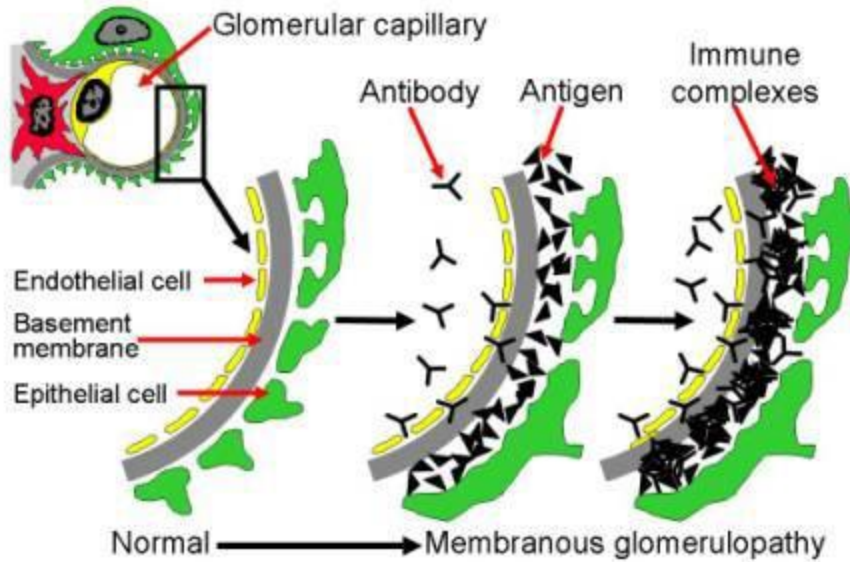
Membranous Nephropathy is a kidney disease that can occur by itself (primary) or in conjunction with several other diseases (secondary) discussed below. Membranous Nephropathy (MN) is one of the most common causes of the *Nephrotic Syndrome* (see below) in adults, and over time can lead to renal failure as well.

Membranous Nephropathy (MN) is caused by the accumulation of *immune complexes* within the kidney itself. *Immune Complexes* are created when a person's antibodies attack something they consider foreign to the body (an *antigen*), often an infection of some sort. An *antibody* + an *antigen* = an *immune complex*. These immune complexes are normally eliminated while still in the circulation, but under certain conditions can accumulate in different parts of the body. Both the immune complexes and the parts of the kidney where they accumulate are extremely small and can only be seen under a microscope. Therefore, in order to be diagnosed with Membranous Nephropathy, a person must first undergo a kidney biopsy.

What does it look like?

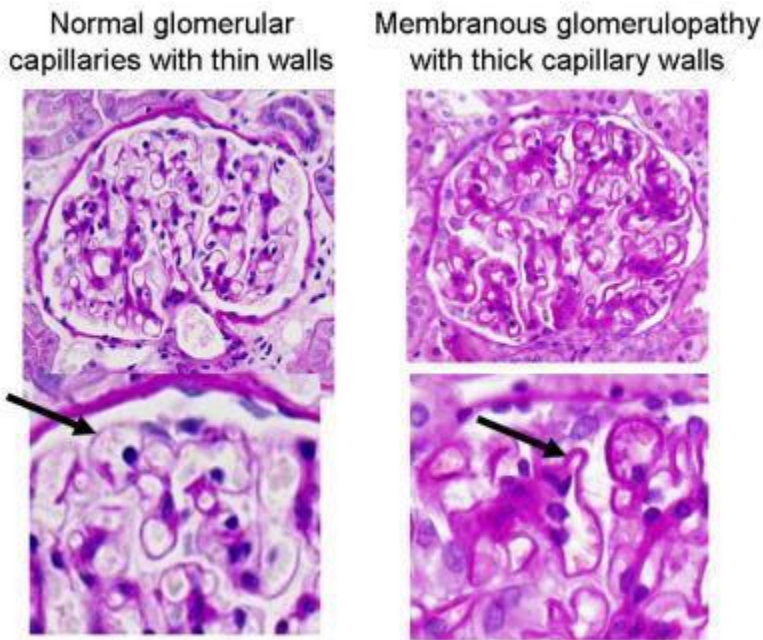
First a quick overview of the kidney- most people have two kidneys, one on each side of their lower back. All of the blood in your body passes through your kidneys many times during the day, and each time blood goes through some of it gets filtered by the glomeruli (singular = glomerulus). This filtering is how your body cleans the blood and removes extra water, and this filtered blood becomes your urine. Urine isn't red (like blood) because the red blood cells, which give blood its color, are too big to fit through the filters. A glomerulus is just a tiny bag of blood vessels through which blood gets filtered, and all of the filtered out blood (urine) runs into tubes (ureters) that eventually lead to your bladder.

Below is a diagram of how the immune complexes deposit in the kidney. Pictured is a single blood vessel from a glomerulus, shown in cross section. Inside the circle is the center of the vessel, where blood is. The filtering occurs through the yellow, gray, and green walls, after which it is considered urine. The yellow is part of the blood vessel itself, and the green is part of a kidney cell called a *podocyte*. The gray is a substance called the *basement membrane*.



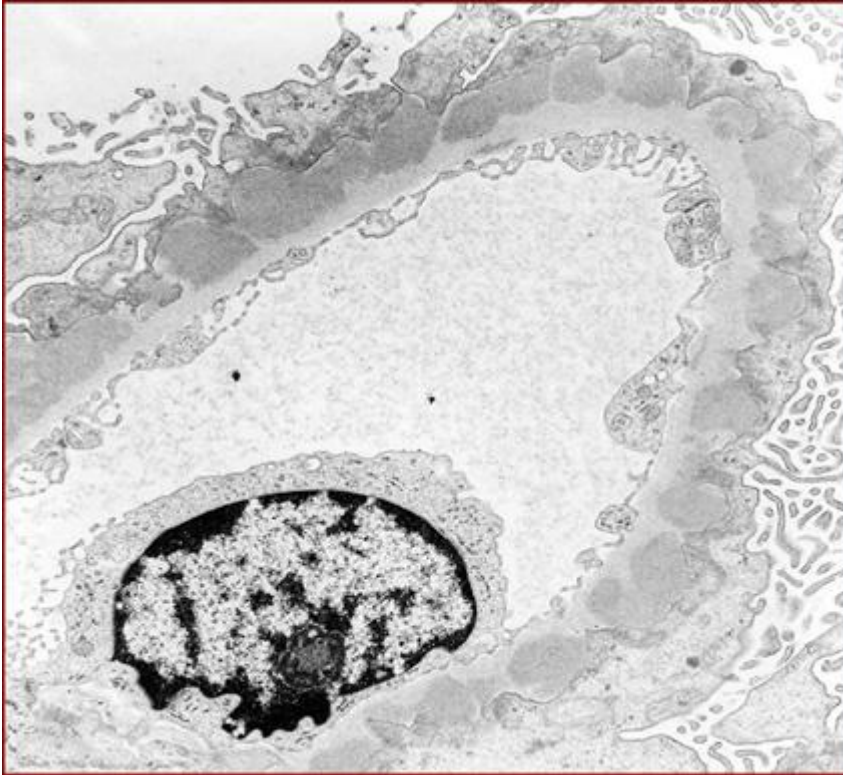
The expanded box shows how the immune complexes form in detail. The antibodies floating in the blood pass through the vessel wall and encounter the antigen. The resulting immune complexes become lodged in that space, and over time begin to further activate the immune system. This activation causes inflammation and damages the kidney itself.

This damage can be seen under the microscope as a “thickening” of the vessel walls within the glomeruli. Below are shown two glomeruli, both with a more detailed picture underneath. On the right is a normal glomerulus, and on the left is shown the changes of Membranous Nephropathy (also called Membranous Glomerulopathy).



The arrows in both pictures are pointing out the thickness of the capillary (small blood vessel wall). Notice how much thicker this wall is from a patient with MN.

Below is another picture of a capillary wall from someone with MN, this time as seen by an electron microscope, which can magnify things to over a million times their normal size.



The vessel wall is the large “hollow” oval extending the length of the picture. Notice all of the slightly darker “clumps” within the capillary wall- these are the actual immune complexes, already deposited.

How did I get it?

Membranous Nephropathy usually occurs in adults older than forty, and is fairly rare in children. Men are affected more often than women, and whites more commonly than blacks. Though we know how the kidney damage occurs in MN, we don't know exactly why the *immune complexes* occur in all people. In these cases the disease is called *Primary* Membranous Nephropathy. In *Secondary* Membranous Nephropathy, the same type of kidney injury occurs but is associated with, or maybe even caused by, another illness. Some of the more common diseases are:

- Systemic Lupus Erythematosus (Lupus)
- Hepatitis B and C
- Cancers (especially of the lung or colon)

Secondary MN has also been associated with some drugs, such as penicillamine, gold, and non-steroidal anti-inflammatory drugs. Anyone who is found to have MN, especially those over 50 years old, should be tested for Hepatitis and undergo at least routine age appropriate cancer screening.

What are the symptoms?

The most noticeable symptom of Membranous Nephropathy is often edema, or swelling, which can be profound. This typically starts in the feet and legs, but can move into the hips and abdomen as well. Other symptoms include high blood pressure, high cholesterol, and a tendency to form blood clots.

Protein levels can be measured in a urine sample, and kidney function can be calculated from a blood test alone or measured more directly using a 24-hour urine collection. MN can cause proteinuria alone or proteinuria and renal failure together, so both must be assessed by your doctor.

None of the above symptoms, or even all of them together, is specific for MCD. If you or your doctor are concerned about MN, the only way to know for sure is to have a kidney biopsy.

The Nephrotic Syndrome

When someone has a great deal of protein in their urine, they can often develop what is called the "Nephrotic Syndrome." This syndrome always includes:

- >3 g proteinuria (protein in the urine) per day
- Hypoalbuminemia (less protein in the blood than normal)
- Peripheral edema (swelling)

It often also includes:

- Hyperlipidemia (high cholesterol)
- Hypercoagulability (increased tendency to form blood clots)

Membranous Nephropathy often causes the Nephrotic Syndrome.

Treatment

Membranous Nephropathy is not an easy disease to treat, and anyone with this disease should be seen regularly by a kidney specialist. It is important to be on a medication that reduces the amount of protein in the urine. These medications are called ACE-inhibitors (angiotensin converting enzyme inhibitors) and ARBs (angiotensin II receptor blockers). If urine protein levels are high, the complications of the Nephrotic Syndrome should also be considered; patients should receive routine cholesterol screening/treatment, and their physicians should always remember their tendency to form clots. Finally, patients with MN must have their kidney function monitored regularly. If kidney function declines, certain other interventions may become necessary.

In addition to the above, many different types of immunosuppressants, or drugs that suppress the immune system, are also being used to treat Membranous Nephropathy. The most common of these, and perhaps the most successful so far, are steroids. For MN this is often combined with another type of chemotherapy, such as cyclophosphamide or chlorambucil. Unfortunately, all of these drugs have significant side effects, and their use must be considered on a patient-by-patient basis.

Finally, if the MN is considered *secondary*, then it is most important to treat the underlying disease (infection, cancer, or autoimmune) or to stop the causative drug. Often this is enough to resolve, or at least significantly improve, the kidney disease.

Prognosis

Strangely enough, up to 40% of patients diagnosed with MN undergo a spontaneous remission within 5 years, even without therapy. These patients do not necessarily remain in remission, however. On average, 20 years after diagnosis, 1/3 of patients will be in complete remission, 1/3 will have progressed to end-stage renal disease (dialysis dependent), and 1/3 will be somewhere in the middle. Those people that initially have more than a gram of protein in their urine per day for more than six months tend to do worse, in that their renal function often declines regardless of therapy.

Kidney Transplant in Membranous Nephropathy

Unfortunately, many patients diagnosed with FSGS will eventually progress to kidney failure. Fortunately, kidney transplant is a treatment option for these patients.

For some general information about kidney transplant, click [here](#).

Will the membranous nephropathy come back in my kidney transplant?

There is a 10-30% chance that the membranous nephropathy will return in your transplant. Unfortunately, there are no factors that have been identified to give us an idea of patients at risk for this problem. Generally, recurrence of the disease will occur in the first 2 years after transplant.

Is there any treatment for membranous nephropathy that comes back in a transplant?

Currently, there are no specific therapies for recurrent membranous nephropathy in the transplant. However, some of the newer immunosuppressive drugs have been shown to be effective in treating membranous nephropathy in native (original) kidneys, and are starting to be used in transplant patients with recurrent membranous nephropathy.

If the membranous nephropathy does come back, will it cause me to lose my kidney transplant?

There is some controversy about the degree to which recurrent membranous nephropathy affects the survival of a transplanted kidney. Some studies suggest that up to 50% of patients with recurrent membranous nephropathy will lose their kidney as a result of the disease. Of all patients with membranous nephropathy that get a transplant, around 10-15% of them will eventually lose the kidney due to recurrent disease.