



The Kidney and Lupus

**REVISED 2018-02-01 BY THE
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The Kidney

- ❖ Lupus nephritis has very few signs or symptoms – it can remain undetected for a long period of time.
- ❖ That is why it is important for people with lupus to have regular medical checkups and urine tests, even if they are feeling well or their lupus has been calm for months or years.
- ❖ Your kidneys are two bean-shaped organs located in the middle of your back, below the rib cage, one on each side of your spine. They are each about the size of a fist.

The Kidney

- ❖ The main function of the kidneys is to remove waste products and other toxins from the body.
- ❖ Each kidney has about one million tiny filters, or glomeruli.
- ❖ Each glomerulus is attached to a tubule (this glomerulus-tubule team is called a nephron).
- ❖ Blood is filtered in the glomerulus, and waste and extra water are collected in the tubule, where they become urine.
- ❖ The urine moves from the kidneys to the bladder through tubes called the ureters and is then passed out of the body.

Lupus Nephritis

- ❖ In systemic lupus, the immune system is overactive, producing antibodies to the body's own tissues.
- ❖ The antibodies combine with the tissues to form immune complexes in the bloodstream.
- ❖ They can cause inflammation, cell death and scarring in any organ, including the kidneys, where they can get trapped by the kidneys' filtering system.
- ❖ When the kidneys are inflamed, their ability to do this job is impaired, and red blood cells or proteins, which are normally kept in the blood stream by the kidneys, may leak into the urine.

Lupus Nephritis

- ❖ Tests may also show that the kidneys have lost some of the ability to remove waste products from the blood, which can become very serious.
- ❖ As blood proteins such as albumin are lost through the urine, their levels may drop in the bloodstream (therefore, serum albumin tests are helpful in diagnosing kidney problems). Albumin helps to regulate the amount of fluid in the body.
- ❖ When there is an insufficient amount of albumin, fluid can build up in the face, hands, feet or ankles and cause swelling or puffiness (edema) that may get worse as the day progresses.

Kidney Symptoms

- ❖ There is usually no pain associated with kidney disease, although some patients may notice swelling in their ankles.
- ❖ Kidney stones (renal calculi) on the other hand can be very painful and are separate from inflammation.
- ❖ Most often, the only indication of kidney disease is an abnormal urine or blood test, so it is important to do these tests regularly, even if you are feeling well.

Warning Signs

- ❖ Large amounts of protein in the urine (proteinuria, which may cause urine to look foamy); getting up frequently to urinate during the night can be a sign of excessive protein loss.
- ❖ The presence of casts in the urine (blood cells that may collect in the kidney to form and be excreted in the urine); they can be seen under a microscope.
- ❖ Red blood cells in the urine (hematuria, which may give urine a pink or cola-coloured tint).
- ❖ White blood cells in the urine (leukocyturia).

Warning Signs

- ❖ Low blood protein (hypoproteinemia).
- ❖ Edema (swelling in parts of the body, such as hands and ankles and around the eyes).
- ❖ Signs or symptoms of kidney disease that can be confused with lupus nephritis may be caused by some of the drugs used to treat lupus. These problems usually stop when the medications are discontinued.
- ❖ Two medications that can cause fluid retention or loss of kidney function are salicylate compounds (for example, aspirin) and non-steroidal anti-inflammatory drugs (NSAID's).

Diagnosing Kidney Disease

- ❖ Urinalysis can estimate how much damage or activity there is in the kidneys by indicating levels of protein and red blood cells.
- ❖ A more accurate test of protein loss and kidney function is the 24-hour urine collection. As the name suggests, the patient collects all urine passed over a 24-hour period in a special container.
- ❖ The urine is analyzed to determine if the kidneys are filtering properly and how much protein is being lost.

Diagnosing Kidney Disease

- ❖ Blood tests determine if the kidneys are filtering properly by measuring the levels of waste products.
- ❖ The serum creatinine test checks for creatinine, which is a by product of muscle protein metabolism.
- ❖ Other blood tests may help your doctor make a diagnosis.
- ❖ Two commonly used tests are the serum complement test, which measures the levels of proteins in the blood that are typically low in certain types of active lupus, and an anti-double-stranded DNA (also called anti-DNA) test, which measures antibodies that sometimes indicate active lupus.

Diagnosing Kidney Disease

- ❖ The blood test eGFR is the calculated glomerular filtration rate which is used to screen and detect early kidney damage.
- ❖ The eGFR is also used to monitor chronic kidney disease, diabetes and hypertension.
- ❖ The eGFR can be tested when the creatinine test is done.
- ❖ Subtle changes as shown on the next slide can be an early clue of kidney involvement.

Diagnosing Kidney Disease

Glomerular Filtration Rate (eGFR)

98

Normal eGFR is described as greater than or equal to 90 ml/min/1.73 m².

Glomerular Filtration Rate (eGFR)

67

An eGFR from 60-89 ml/min/1.73 m² is consistent with mildly decreased kidney function. However, in the absence of other evidence of kidney disease, eGFR values in this range do not fulfill the KDIGO criteria for chronic kidney disease. Interpret results in concert with ACR measurement.

Diagnosing Kidney Disease

- ❖ If your doctor suspects your kidneys are damaged, he or she may order an ultrasound, X-ray or biopsy to find out the extent of the damage.
- ❖ A kidney biopsy is also useful to assess the extent and type of lupus nephritis. In a kidney biopsy, a needle is used to extract tiny samples of tissue, which are then examined under a microscope.
- ❖ A biopsy can provide information to confirm kidney disease, determine whether inflammation or scarring has occurred, and identify the cause.
- ❖ It may show deposits of antibodies and immune complexes in the glomerulus/kidney filtration unit.



Treatment for Lupus Nephritis

- ❖ The course of treatment depends on the degree of damage to the kidneys.
- ❖ In mild cases, treatment may be the same as it is for lupus patients who do not have kidney disease.
- ❖ In severe cases, your doctor may take a more aggressive approach using corticosteroids and/or other immunosuppressive drugs.
- ❖ With glomerulonephritis, avoid strep infections and treat them aggressively.



Treatment for Lupus Nephritis

- ❖ There are two major forms of drug therapy used for lupus nephritis:
 - ❖ High doses of corticosteroids (such as prednisone) taken orally or intravenously to control inflammation.
 - ❖ And ‘steroid-sparing’ drugs to suppress the activity of the immune system long-term (see section on lupus medications).
 - ❖ Corticosteroids and steroid-sparing drugs combat the hyperactivity of the immune system, to prevent more damage to the kidneys.

Treatment for Lupus Nephritis

- ❖ The most commonly used steroid-sparing drugs in lupus nephritis include cyclophosphamide (Cytoxan), mycophenolate (CellCept) and azathioprine (Imuran).
- ❖ Cyclophosphamide has historically been the standard treatment for the most severe forms of lupus nephritis, but has several potential negative side effects.
- ❖ In fact, all drugs have potential side-effects. Thus, your doctor will aim for optimal control of kidney disease with a variety of medications and dosages that may vary over time, in an effort to limit side effects while maximizing benefit.



Treatment for Lupus Nephritis

- ❖ If the blood pressure is high, medication to treat this (an anti-hypertensive) may also be prescribed.
- ❖ Two very important types of medications for people with active kidney disease are ‘**angiotensinogen converting enzyme (ACE) inhibitors**’ (for example Benazepril (Lotensin[®]), Captopril (Capoten[®]), Cilazapril (Inhibace[®]), Enalapril (Vasotec[®]), Fosinopril (Monopril[®] discontinued), Lisinopril (Prinivil[®], Zestril[®]), Perindopril (Coversyl[®]), Quinapril (Accupril[®]), Ramipril (Altace[®]), Trandolapril (Mavik[®]), etc.) and ‘**angiotensin receptor blockers**’ (ARB’s), such as Irbesartan (Avapro[®]), Losartan (Cozaar[®]), Valsartan (Diovan[®]), etc.
- ❖ Ontario Meds Check Program <https://www.ontario.ca/page/take-your-medication-safely>

Treatment for Lupus Nephritis

- ❖ Diuretic agents may be used to relieve swelling due to excess fluid in the body, and your doctor may recommend dietary changes including reduced salt (sodium), animal protein and calorie intake, and possibly restricted intake of water and potassium (found in many foods, especially certain fruits and vegetables). In other cases increased water intake is recommended. Treatment must be individualized.
- ❖ Common diuretics include furosemide (Lasix), triamterene/HCT (Novo-Trimzide), torsemide (Demadex), and indapamide (Lozol).

Treatment for Lupus Nephritis

- ❖ If the damage is severe and the kidneys fail, dialysis or a kidney transplant may be necessary.
- ❖ Over the past few decades, we have learned a lot about lupus nephritis and treatment has improved.
- ❖ It is hoped that with additional research, fewer and fewer lupus patients will suffer kidney damage.



Treatment for Lupus Nephritis

- ❖ Kidney nutrition support includes vitamin B6 pyridoxine in a balanced B complex, vitamin B5 pantothenic acid, vitamin A – beta-carotene, magnesium and potassium.
- ❖ Vitamin B6 rich foods include chicken liver, sunflower seeds, salmon, avocado, sun dried tomatoes, corn, broccoli, banana, venison, mushrooms, cauliflower, sweet potato and organic yogurt.
- ❖ Vitamin B5 rich foods include seafood, lean meats, poultry, eggs, legumes (beans and peas), nuts, seeds, soy products, oily fish, cheese and beef.



Treatment for Lupus Nephritis

- ❖ Vitamin A – beta-carotene rich foods include beef liver, carrots, sweet potato, kale, spinach, broccoli, butter, eggs, apricots and winter squash.
- ❖ Magnesium rich foods include legumes, nuts, seeds, whole grains, green leafy vegetables, dark chocolate, avocado, tofu, banana, salmon, mackerel and halibut.
- ❖ Potassium rich foods include winter squash, sweet potato, potato, sun dried tomatoes, kidney beans, dried apricots, dried peaches, dried figs, banana, avocado, wild salmon, tuna, halibut, flounder and Pacific cod.



Treatment for Lupus Nephritis

- ❖ Movement and exercise are essential to improve lymphatic drainage and increase blood circulation.
 - ❖ Gentle stretching.
 - ❖ Walking.
 - ❖ Minor limb movements such as ankle circles or finger exercises.
- ❖ Self massage from the extremities, hands and feet, towards the heart can help reduce edema and increase circulation.
- ❖ Acupuncture can also reduce edema, increase circulation and balance energy of the kidney meridian.

Treatment for Lupus Nephritis

- ❖ Ask your medical team what you can do to enhance your treatment of kidney symptoms.
- ❖ You have control over taking your medications as prescribed, your diet, getting enough appropriate exercise, reducing cortisol production through stress management techniques, the quantity and quality of sleep, and getting your lab work done on time as requested by your medical team.
- ❖ Compliance with your treatment plan is essential to managing the effects of kidney involvement in your lupus.