

# Protein-Losing Nephropathy in Dogs

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## BASIC INFORMATION

### Description

Protein-losing nephropathy (PLN) refers to any kidney disease that results in excess protein loss in the urine. Such conditions include glomerulonephritis (an inflammation of the glomerulus in the kidney), inherited glomerulopathy (noninflammatory disease of the glomerulus), and amyloidosis (a deposition of abnormal protein in the kidneys).

### Causes

Glomerulonephritis can be caused by many different diseases. Generally, the kidney damage is caused by the immune system's response to various infections, widespread inflammation, or cancer. Glomerulonephritis can be a component of other immune diseases, such as systemic lupus erythematosus (called lupus or SLE) or polyarthritis. In about half of the cases, no underlying cause or triggering event is ever found.

As part of the immune response, immune complexes are deposited in the glomerulus, which damages the filtering membranes and allows proteins to leak into the urine. Breeds of dogs predisposed to glomerular diseases include the beagle, Bernese Mountain dog, bullmastiff, bull terrier, English cocker spaniel, Rottweiler, Samoyed, and soft-coated wheaten terrier.

Amyloidosis is the buildup of an abnormal protein material (amyloid) in the kidney, which also leads to increased loss of protein in the urine. Dog breeds that are predisposed to this disease include the Chinese shar-pei, beagle, and English foxhound. Abyssinian, Oriental shorthair, and Siamese cats are predisposed to amyloidosis. Amyloidosis can also be caused by chronic inflammation in the body or be associated with cancer.

### Clinical Signs

In the early stages, no clinical signs specifically associated with PLN may occur, although signs of the underlying disease condition may be apparent. By the time clinical signs appear, substantial damage has usually already occurred in the kidneys. Signs include increased water consumption and urine output, poor appetite, weight loss, and poor hair coat. With very substantial protein loss, edema of the legs and abdomen may develop. Signs of kidney failure, such as vomiting, depression, dehydration, and uremic odor to the breath, may also be noted.

### Diagnostic Tests

With PLN, a urinalysis shows increased amounts of protein in the urine, which can be measured with a urine test called a *urine protein/creatinine ratio*. Routine urinalysis as part of wellness or recheck examinations (for other forms of kidney disease) can detect excess protein in the urine in the early stages of this disease.

Other tests are commonly performed to look for the underlying cause, such as routine laboratory tests, urine culture, heartworm test, tests for Lyme disease and other infectious diseases, blood pressure measurement, chest and abdominal x-rays, and an abdominal ultrasound. Depending on the results of these tests, further testing may also be indicated. A kidney biopsy can provide much information about the type and severity of disease present.

## TREATMENT AND FOLLOW-UP

### Treatment Options

Specific therapy is started for the underlying cause of the PLN. Standard treatment for PLN itself includes feeding a special kidney diet that helps decrease the amount of protein lost in the urine. Drugs that decrease protein loss, such as angiotensin-converting enzyme (ACE) inhibitors (enalapril, benazepril, and others), may be recommended. Aspirin is usually given (after kidney biopsy), because PLN increases the risk of blood clots. If hypertension is present, it can be difficult to control and may require a combination of medications.

In some cases, drugs that suppress the immune system are used, but they often have variable results. Examples include steroids in cats and azathioprine, cyclophosphamide, and cyclosporine in dogs. Dogs with spontaneous amyloidosis may be treated with drugs such as colchicine, but these drugs are not very effective if kidney failure is present. Other treatments for chronic kidney disease are used as needed.

### Follow-up Care

After starting an ACE inhibitor or other blood pressure medications, as well as when dosages are increased, laboratory tests (including creatinine and potassium), blood pressure measurement (when available), and urine protein/creatinine ratios are usually rechecked within 2 weeks. After all results and signs become stable, examinations and laboratory tests may be scheduled every 3 months (at least). Other monitoring may be recommended, depending on any underlying cause identified.

### Prognosis

The use of ACE inhibitor drugs helps slow the progression of kidney damage, and dogs diagnosed early in the disease (prior to abnormal blood test results) can live for more than 1-2 years. Once the kidneys begin to fail and blood creatinine levels are moderately to severely elevated, the prognosis is poor and survival times are usually much shorter (months). In some cases, progression is very rapid, with the animal surviving only days.