

Glomerular Disease in Dogs

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Glomerular disease (chronic [kidney disease](#)) occurs quite commonly in [dogs](#). It affects purebreds and mixed-breeds alike, and can be an inherited disorder in certain [breeds](#). According to [dvm360.com](#) those breeds include:

- [Shar Pei](#)
- [Soft Coated Wheaten Terrier](#)
- [Bull Terrier](#)
- [Dalmatian](#)
- [Samoyed](#)
- [Bernese Mountain Dog](#)
- [Doberman Pinscher](#)
- [Newfoundland](#)
- [English Cocker Spaniel](#)

Does glomerular disease have other names?

[Veterinarians](#) use a number of different terms interchangeably when describing "glomerular disease." I'll warn you in advance that none of them are easy to pronounce:

- Glomerulopathy
- Glomerulonephropathy
- Glomerulonephritis
- Protein losing nephropathy

What are glomeruli and why should you care?

To understand glomerular disease, it's important to first understand glomeruli. Each [kidney](#) contains millions of glomeruli; microscopic filtration units that interface with the [blood](#) vessels that supply the kidneys. I like to think of glomeruli as a tiny sieve or colander because the size of glomerular pores dictate which substances within the blood are allowed to enter into the fluid that ultimately becomes [urine](#). Normal glomeruli do not allow larger protein molecules such as albumin to pass into the urine.

Glomerular damage causing glomerular disease

Glomerular damage is what leads to glomerular disease. The most common means by which glomeruli are damaged include:

- Inflammation, particularly that which is immune mediated (autoimmune) in nature
- A form of scarring referred to as glomerulosclerosis
- Persistent high pressure blood flow to the kidneys (elevated blood pressure)
- A protein problem called amyloidosis

What problems are associated with glomerular disease?

Glomerular damage may be present at the very earliest onset of kidney disease, well before there are other measurable laboratory changes or symptoms typically associated with kidney disease. Moreover, dogs with glomerular damage are far more likely to develop significant illness and/or death as a result of their kidney disorders¹. In other words, glomerular disease, particularly when left untreated, hastens the progression of [chronic kidney disease](#).

Glomerular damage can arise as a primary [disease](#) process, or it can occur as a result of another underlying disease. Diseases commonly associated include:

- [Heartworm disease](#)
- [Cushing's disease](#)
- [Diabetes](#) mellitus
- Pyometra
- [Pancreatitis](#)
- [Infectious diseases](#) (Lyme disease, Ehrlichiosis, Leishmaniasis)
- [Cancer](#)
- Immune mediated (autoimmune) diseases

When glomeruli are damaged, they become "leakier," thus allowing large protein molecules to filter into the urine ([proteinuria](#)).

Symptoms of glomerular disease

Persistent proteinuria (increased protein within the urine) is a hallmark characteristic of glomerular disease.

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In and of itself, protein loss in the urine does not cause any symptoms. This is why many dogs with glomerular disease, particularly early on, appear completely normal. When symptoms do arise, they are usually related to one or more of the following:

- The underlying disease process causing the glomerular damage (see the list above)
- Chronic kidney disease
- Complications associated with glomerular damage (high blood pressure, decreased protein in the bloodstream, blood clot formation)

Some common symptoms observed in dogs with chronic kidney disease include:

- [Vomiting](#)
- [Loss of appetite](#)
- [Lethargy](#)
- [Increased thirst](#) and urine output
- [Weight loss](#)
- [Halitosis](#) (bad breath)

Testing for glomerular disease

There are several laboratory tests that can be used to assess protein within the urine. The first test will probably be a urinalysis.

Urine dipsticks provide “semi-quantitative results.” This means that a positive test result gives only a rough idea of how much protein is in the urine. It’s critical to always start with a complete urinalysis because the urine quality and presence of any inflammatory cells or blood can influence protein levels.

The urinalysis may be falsely positive for protein. Additionally, it is not always sensitive enough to detect the very earliest stages of glomerular damage. For these reasons, your veterinarian may discuss additional testing.

Diagnosing glomerular disease

If a dog demonstrates persistent proteinuria (repeatable on multiple tests over the course of a few weeks), a battery of tests is typically recommended to rule out non-glomerular causes of excess protein within the

urine such as [urinary tract infection](#), stones, or bleeding. This testing typically includes the following:

- Complete blood cell count (CBC)
- Blood chemistry profile
- Urinalysis
- Urine culture
- Abdominal ultrasound or [x-rays](#)

Other tests may be recommended for purposes of ruling out [heartworm disease](#), [infectious processes](#), [cancer](#), and other diseases that can cause glomerular damage.

Diagnostics may include:

- Heartworm testing
- Chest x-rays
- Abdominal ultrasound
- Specific tests for tick-borne infections
- Blood pressure measurement

A clear-cut diagnosis of glomerular disease requires a kidney biopsy. This can be accomplished via [surgery](#), laparoscopy, or with ultrasound guidance. Whichever methodology is used, collection of a kidney biopsy has the potential to cause significant complications. Thoughtful discussion with a veterinarian about risks and benefits should always precede a kidney biopsy.

Complications commonly caused by glomerular disease

As if glomerular disease isn’t enough to worry about, it is capable of causing a number of serious secondary issues including:

- Hypertension (high blood pressure): This can cause damage in heart, kidneys, brain, and/or retinas; hypertension promotes proteinuria
- Hypercoagulability (an increased propensity to form blood clots): [Thromboembolism](#) (blood clot) formation can occur within any organ
- Chronic kidney disease (rarely, acute kidney injury)

Treatment of glomerular disease

There are four primary goals when treating canine

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glomerular disease. How they are implemented will depend, in part, on the dog's kidney function and degree of proteinuria.

1. Identify and eliminate the underlying cause of the glomerular damage

Doing so may resolve the proteinuria altogether (the best outcome possible). For example, successful treatment of heartworm disease often eliminates the associated glomerular damage. Unfortunately, in many cases, the underlying cause of the glomerular disease cannot be identified or successfully eliminated.

2. Attempt to lessen the degree of proteinuria

Doing so is the best bet for slowing the progression of kidney damage and other complications associated with glomerular disease. The mainstays of such therapy include:

- Feeding a [diet](#) that is low in protein quantity; this decreases the amount of protein filtered by the kidneys.
- Supplementation with omega-3 fatty acids; their anti-inflammatory effects are thought to be responsible for decreasing proteinuria.
- Administration of an angiotensin-converting-enzyme inhibitor drug (enalapril, benazepril); this alters microscopic blood flow at the level of the kidneys.

3. Treatment of glomerular disease complications

Examples of such treatments include, administration of [medications](#) to control high blood pressure, anticoagulant therapy to help prevent blood clot formation, and daily subcutaneous fluids to manage dehydration associated with chronic kidney disease.

4. Follow up monitoring

Once the diagnosis of glomerular disease is made and treatment is instituted, there will be a need for ongoing monitoring. The results of such monitoring will direct how the dog's therapy should be adjusted.

The treatment of glomerular disease can be challenging, and the more experience a veterinarian

has with this disease, the better. For this reason, when glomerular disorder is suspected or has been diagnosed, I strongly encourage consulting with a veterinarian who specializes in small animal internal medicine (check with your veterinarian). To learn more about the treatment of glomerular disease, I invite you to read, "Consensus Recommendations for Standard Therapy of Glomerular Disease in Dogs" prepared by veterinarians who are members of the [International Renal Interest Society](#) (IRIS).

Prognosis of glomerular disease

The earlier glomerular disease is detected and managed, the greater the likelihood of deterring a negative outcome. Left unchecked, glomerular disease is known to increase the severity and progression of kidney disease.

Canine glomerular disease is often associated with chronic kidney disease which may progress very slowly, very quickly, or anything in between. Some dogs live for several years with glomerular disease. The likelihood of such an outcome is far greater with appropriate treatment and monitoring.

Nephrotic syndrome

Dogs with severe glomerular disease can progress to a condition that is referred to as nephrotic syndrome. This is characterized by the following four abnormalities:

- Excess protein loss in the urine
- Decreased protein (specifically albumin) within the blood stream
- Elevated blood cholesterol level
- Presence of edema (accumulation of watery fluid under the skin or within body cavities)

Nephrotic syndrome represents an advanced stage of glomerular disease with a poor prognosis. In addition to the treatment options mentioned above, measures to manage the edema (fluid drainage, specific medications) may be warranted.

[Click here to learn more about chronic kidney disease in dogs.](#)

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Questions for your veterinarian

- Have causes of proteinuria other than glomerular disease been ruled out?
- How severe is the protein loss?
- Does my dog have advanced chronic kidney disease?
- Have tests been performed to rule out an underlying cause of the glomerular disease?
- What are the risks and benefits of a kidney biopsy?
- What are the treatment options?
- Should my dog's diet be modified?
- How frequently should my dog be reevaluated?

If you have any questions or concerns, you should always visit or call your veterinarian -- they are your best resource to ensure the health and well-being of your pets.

Resources:

1. [Jacob, F., DJ Polzin, and CA Osborne. "Evaluation of the Association between Initial Proteinuria and Morbidity Rate or Death in Dogs with Naturally Occurring Chronic Renal Failure." PubMed.gov. U.S. National Library of Medicine. Web.](#)

Dog Kidney Disease Articles

[Chronic Kidney Disease: What Does Kidney Failure in Dogs Really Mean?](#)

[10 Common Causes of Kidney Disease in Dogs](#)