Kidney Disease

Dogs and cats, like people, have two kidneys which:

- Filter out waste products from the blood and excrete them in urine
- Regulate water and salt balance in the body
- Produce various hormones and help to control blood pressure
- Help with red blood cell production

If the kidneys cannot do these jobs properly, the level of waste products in the blood tends to rise, the body can become dehydrated easily, abnormal blood pressure may develop and, sometimes, the pet can become anaemic.

What causes kidney disease?

Many factors can be responsible for kidney damage, such as infection, genetics, severe dehydration, bladder obstruction, trauma, various toxins and cancer.

However, in most cases of kidney disease that we see, the kidney disease is a result of slow, age-related degeneration over time as the kidneys just begin to 'wear out'. We call this slow, progressive kidney disease Chronic Kidney Disease. Chronic kidney disease is more common in cats than dogs and as many as 50% of cats over 15 years of age have some chronic kidney disease.

The signs of kidney disease

The earliest signs of kidney disease are:

- Increased thirst (polydipsia)
- Increased urine volume (polyuria)

These signs can be more challenging to pick up in cats as many of them drink and urinate outside.

Unfortunately other signs are often not seen until more than 2/3 of the kidneys are damaged. They may include the following:

- Weight loss
- Poor hair coat
- Reduced appetite
- Recurrent bladder infections

If the kidney function reduces even further, additional signs may be seen, including:

- Further loss of appetite and weight loss
- Vomiting
- Ulcers in the mouth
- 'Uraemic' (foul, ammonia-smelling) breath
- Lethargy and muscle weakness

How is kidney disease diagnosed?

Your vet may be suspicious from the symptoms and examination findings that your pet has kidney problems. In some cases abnormally small or large kidneys can be felt on abdominal examination depending on the size and shape of your pet.

The main tests for diagnosing kidney disease are:

- Urine testing

  Poorly concentrated urine can be a sign of kidney disease. The reduced urine concentration will develop before changes occur in the blood. The urine can also be tested for infection, protein loss and blood. This is a very useful test.

- Blood tests

  As the kidneys become less good at filtering the blood, the levels of waste products in the blood will rise and can be detected on a blood test. Initial tests usually check urea and creatinine levels. If these levels are high at the same time that urine and examination findings support a diagnosis of kidney disease, the diagnosis is made. However, urea and creatinine levels only tend to rise when around 70% of the kidneys are damaged. This means

that pets in the earlier stages of kidney disease may have normal urea and creatinine levels. If your vet suspects kidney disease, but the urea and creatinine are not high, an additional blood test can be run to measure the SDMA (symmetric dimethylarginine) level in the blood. SDMA levels tend to rise at an earlier stage in the disease (when around 40% of the kidneys are damaged) so this test is more sensitive.

Finding out the cause of kidney disease

In some cases, we do not test further to look for an underlying cause because all of the evidence already points to the kidney disease being age-related.
In other cases we will already know of a different cause (for example pets that have developed kidney disease after eating poisonous substances that are known to cause kidney damage).
However, for younger to middle-aged pets with no reason to have developed kidney disease, it is a good idea to investigate further to see if there is an underlying cause. This may involve:

- Ultrasound scan of the kidneys. The scan can check the size and shape of the kidneys, look for abnormalities in the different layers of the kidney, and detect cysts or tumours in the kidneys.
- Sending a urine sample for culture to look for infectious causes. For this test, it may be better to use a sterile urine sample taken directly from the bladder using a catheter or needle, than one collected in the usual way.
- Biopsy of the kidney. This is rarely recommended because it requires an anaesthetic and operation with significant risks of complication.

What happens next?

If there is an underlying cause for the kidney disease (such as infection, cancer, or toxicity), it may be possible to reverse the kidney damage by treating the underlying cause.
However, for all of the pets with slowly progressing chronic kidney disease, it is not possible to reverse or cure the condition. Instead, we need to look at ways of slowing down the kidney damage in the future, and treating any problems caused by the reduced kidney function.
An international system has been set up to standardise the way that vets monitor and manage cats and dogs with chronic kidney disease. This system is known as the IRIS staging system, and further information is available at www.iris-kidney.com. Carrying out some extra tests to 'stage' your pet's kidney disease allows your vet to create a individual package of recommendations and treatments to make your cat feel as well as possible for as long as possible.

IRIS staging

Each pet can be put into a category, or 'stage' of chronic kidney disease, based on blood test results, with stage 1 being the earliest / mildest stage, and stage 4 the most advanced. The pet's blood pressure is measured and another urine sample is sent away for a special test to check for protein leakage (the UPC test). The blood phosphate level is also important and can usually be found on the original blood tests alongside the urea and creatinine levels.

Once all of this information has been put together, we can classify every pet with CKD as follows:

IRIS stage (recommend renal diet for stages 3 and 4; renal or 'senior' diet for stage 2)	High blood pressure? (Treat with amlodipine if blood pressure is high)	High phosphate levels? (treat with renal diet and/ or a phosphate binder if phosphate level is high)	Protein in urine? (treat with Semintra or Fortekor if UPC is high).
1	yes / no	yes/ no	yes / no
2	yes / no	yes / no	yes / no
3	yes / no	yes / no	yes / no
4	yes / no	yes / no	yes / no

High blood pressure, high phosphate levels and protein in the urine can all be caused by chronic kidney disease. However, in turn, they all go on to cause further kidney damage and make the chronic kidney disease worse. If we check for these complications and correct them, we can interrupt this vicious cycle of kidney damage and hopefully significantly slow down the progression of the kidney disease.

We usually check our chronic kidney disease patients at least every 6 months. Your vet will advise you as to how often the blood tests, urine tests and blood pressure checks should be repeated.

Treatment of kidney disease

With early detection and careful management, pets can live many years of good quality life after diagnosis. Pets that are diagnosed at a more advanced stage of disease can still live for months to years but may require more supportive care. The treatments that may be used include:

1. Special diet

Dietary manipulation is probably the single most important aspect of treatment for dogs and cats with kidney failure. Specially prepared diets lower in protein and

phosphate help to prevent the build up of toxins in the blood and mean that the kidneys do not have to work as hard. In cats, studies have shown that cats fed on the prescription renal diets live more than twice as long as cats that continue to eat their usual diet, following a diagnosis of chronic kidney disease.
Prescription diets are available in wet and dry forms and a choice of flavours. They can be purchased from the surgery or found online. The most common varieties are: Hills K/D, Royal Canin renal, Purina NF and Eukanuba renal. Diet changes should be made gradually, particularly in cats.
If pets refuse to eat the prescription diets (and it is worth trying a number of different brands and speaking to the nurses on the free of charge customer telephone lines provided by the food manufacturers), then a commercial Senior food is better than any other commercial food.

2. Blood pressure

If testing shows that your pet has raised blood pressure, blood pressure medication is prescribed. This is usually a tablet taken once a day on a permanent basis. Blood pressure should be checked at least every 6 months in case a dose change is required.

3. Phosphate binders

If phosphate levels remain too high despite your pet eating a prescription diet (or if they refuse to eat the prescription diet), a phosphate binder can be fed. This binds to the phosphate in the food, so that it is not absorbed by the dog or cat.

4. Treatment to reduce protein in the urine

If the UPC urine test is abnormal, a medication is given to try to reduce or prevent protein leakage into the urine. This is usually given as a liquid for cats or a tablet for dogs and is given on a permanent basis.

5. Treatment for low potassium or low B12

Patients with kidney disease produce dilute urine, and this can lead to excessive loss of substances such as vitamin B12 and potassium from the body. Renal diets have higher levels of potassium and B12 to try to counteract this, so many pets eating a special renal diet will not need additional supplementation. If levels are low, this may cause weakness, lethargy and poor appetite. Levels can be supplemented with injections, granules in the food, liquid or capsules.

6. Treatment for vomiting or nausea / poor appetite

In some cases, the elevated levels of toxins in the bloodstream can irritate the stomach lining and / or trigger the part of the brain responsible for nausea and vomiting. Medications such as antacids (to settle the stomach) or anti-nausea medications can be given by injection or tablet as needed. In the later stages of kidney disease, clients may find it helpful to have a supply of tablets that can be

used to control nausea and stimulate appetite - these can be given as needed to maintain good food intake.

7. Treatment for dehydration

Cats and dogs with kidney disease cannot cope with dehydration and will feel very poorly, very quickly. This can happen in hot weather, with excessive exercise or alongside other illness. It is important that all pets with kidney disease have constant, easy access to fresh water. Never restrict water. Wet, rather than dried food contains a lot of moisture and can make it easier for pets to keep their water intake high.

If a pet with kidney disease suddenly appears to deteriorate, it is often possible to make them feel a lot better by hospitalising them to give intravenous fluids (a drip) for 48 hours or so. This flushes out a lot of the toxins that have built up in the blood stream. In some cases (usually cats with advanced disease, that get a lot better after a drip but deteriorate again quickly) it is a possibility for clients to be taught how to give regular injections of fluid under the skin to manage dehydration at home.

8. Treatment for anaemia

Anaemia may develop in some patients with kidney disease. If this is mild no treatment is needed, but in some cases more severe anaemia can result. This can be managed with a blood transfusion or by administering erythropoietin by injection. Unfortunately, these treatments have limitations, so are only used as a last resort.

<u>Summary</u>

Kidney disease is common in cats and dogs. Many cases are age-related chronic kidney disease which cannot be cured but can be managed to allow pets to live a good quality life for a long time. Dietary change is the most important aspect of treatment, but a variety of other interventions are available to keep pets feeling well for as long as possible. We are well able to support our clients to follow the international IRIS recommendations and provide the best practice care for dogs and cats with kidney disease.

However, we are also aware that some clients may not wish to take this route for their pets. Pet temperament, financial constraints and individual preference will mean that some clients will wish to pick and choose between the different monitoring and treatments to find a combination that suits themselves and their pet. Your veterinary surgeon is there to guide you through these choices and come up with a treatment and monitoring plan that meets your needs.

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