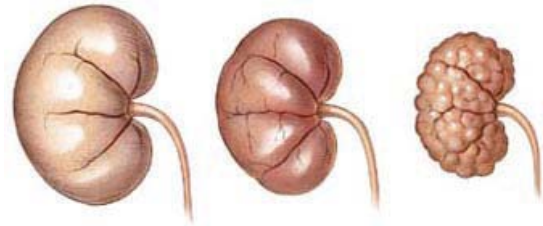


Backgrounder

Chronic Renal Disease (CRD)



Chronic Renal Disease (CRD), also known as Chronic Kidney Disease (CKD), is the progressive and irreversible loss of kidney function over time ultimately resulting in renal failure and, death, if left untreated. It is diagnosed three times more often in cats than dogs and is a major cause of mortality in cats.

CRD is primarily a disease of older felines, affecting one-third of all cats 15 years or older and an estimated 10% of all cats above 7 years of age. Many of these cats, however, go undiagnosed due to the absence of symptoms and sensitive diagnostic tests early in the disease process.

As a result, CRD is generally diagnosed only when the disease is at an advanced stage, when greater than two-thirds of kidney function has already been lost. As CRD cannot be cured, early diagnosis and intervention is important to slow the progression of the disease and improve quality of life and survival outcomes.

Kidney function

The key role of the kidneys is to remove toxic waste products such as urea and creatinine (waste products from metabolism) from the blood. The kidneys also play an important function in regulating blood pressure and the amount of electrolytes in the blood such as potassium, sodium, magnesium, phosphate and calcium which are important for a healthy heart and bones. The kidneys also produce erythropoietin, a hormone which stimulates the bone marrow to produce red blood cells.

With the diverse functions of the kidneys, a wide variety of complications can arise in diseased cats. These include electrolyte abnormalities (e.g. low blood potassium

concentrations), the retention of phosphate in the blood (hyperphosphataemia), the retention of too much acid in the body (acidosis), high blood pressure (hypertension) and the development of anaemia (low red blood cell count).

Causes of CRD

Chronic renal disease occurs where there is long-standing, irreversible damage to the kidneys that impairs their ability to filter and remove waste products from the blood. This damage may occur from acquired disease such as infection, from injury or toxins, or from congenital or genetic conditions. However, in many cases the exact reason for kidney failure is unknown, which is referred to "idiopathic". The most common form of CRD in cats is an idiopathic inflammation of the kidneys that leads to irreversible destruction of kidney tissue.

Symptoms

The typical symptoms of CRD in cats are fairly non-specific and include: weight loss, loss of appetite, increased water consumption, increased sleeping, inactivity and sometimes vomiting as a result of the acidosis and accumulation of toxins in the blood normally excreted by the kidneys. However, most symptoms present only at a late stage in the disease progression and by the time they become apparent, approximately 80-85% of kidney function is lost, at which stage the cat may appear to have become suddenly ill.

Diagnosis

Initial diagnosis of CRD is based on a general physical examination and laboratory tests such as urinalysis and blood chemistry tests. Urinalysis will identify abnormal concentrating ability of the kidneys and blood tests will detect elevation of substances normally excreted by the kidneys (creatinine & blood urea nitrogen). Physical exam helps to identify dehydration, weight loss and, in some cases, abnormal kidney size. Further tests include blood pressure evaluation, eye examinations and blood cell counts to check for anaemia.

Treatment options

CRD cannot be cured. The only realistic target of therapy is to slow the progression of the disease and improve quality of life by reducing symptoms. Treatment management is therefore aimed at maintaining hydration status of the cat and

relieving the burden of uremic toxins on the kidneys. With appropriate treatment, many cats live for a relatively long time with their disease.

The main therapeutic options include:

1) Prescription diets

These diets have a specific composition designed for the renal-compromised cat. The major aim of dietary intervention is to control phosphate intake and renal diets achieve this through the restriction of protein content. Feeding a protein-restricted diet may also reduce the burden of nitrogenous wastes (toxins) on the kidneys. Because cats are carnivores, there is a limit to how much protein can be restricted. Diets may also be supplemented with additional potassium and vitamins that are helpful in cats with kidney disease.

Unfortunately, compliance with dietary foods can be variable due to lower palatability with decreases in the protein content and up to 45% of cats may not accept a change to a renal diet. Diseased cats sometimes have decreased appetite and it is vitally important to keep them eating.

2) Phosphate binders

Phosphate binders are used routinely in humans for CRD and there are now products specifically available for use in cats. They bind directly to the dietary phosphorus in ingested food within the gastrointestinal tract and prevent the absorption of phosphorus into the bloodstream, thereby reducing the phosphorus burden on the kidneys. Control of phosphate intake is an essential part of CRD management as retention of phosphate (hyperphosphataemia) leads to secondary hyperparathyroidism (over production of a hormone known as the parathyroid hormone which regulates the calcium and phosphorus levels in the body). Left unchecked, this can lead to soft tissue calcification of the kidneys and other bodily tissues and decalcification of bones. Additionally, excess phosphorus is associated with the progressive fibrosis and deterioration of the kidneys.

3) Fluid therapy

A major problem in cats with kidney disease is dehydration due to the excess loss of water through the kidneys, which is exacerbated with fluid loss from vomiting or decreased intake through food. Dehydration can lead to a further rapid decline in

kidney function and must be addressed. Cats are sometimes treated with fluids given by injection under the skin or in cases of severe dehydration, are given intravenous fluid therapy.

4) ACE-inhibitors

ACE inhibitors (Angiotensin Converting Enzyme inhibitors) are vasodilators and help to dilate the blood vessels lowering renal blood pressure. They are often used in forms of kidney disease where there is evidence of excessive loss of proteins in the urine.

5) Erythropoietin

Anaemia may occur with chronic renal disease due to the decrease in production of erythropoietin by the kidneys. In cats this is managed with the administration of human recombinant erythropoietin (r-HuEPO). However, up to 25 to 30% of cats may develop antibodies to human EPO, rendering the treatment ineffective.

In addition, a wide range of treatments to control symptoms are sometimes prescribed such as anti-vomiting drugs, anti-hypertensive agents, antibiotics for infections and appetite stimulants.

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