



## O A K B A Y A N I M A L H O S P I T A L

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### **CHRONIC KIDNEY FAILURE**

The term "chronic kidney failure" suggests that the kidneys have quit working and are, therefore, not making urine. However, by definition, kidney failure is the inability of the kidneys to remove waste products from the blood. This definition can occasionally create confusion because some will equate kidney failure with failure to make urine. Kidney failure is NOT the inability to make urine; it is the inability of the kidneys to remove toxic and waste products from the blood. Ironically, most cats in kidney failure are actually producing large quantities of urine, but the body's wastes are not being effectively eliminated.

#### *Is age a factor?*

Many forms of chronic kidney failure are the end result of infections or toxins damaging the kidneys. However, the typical form of chronic kidney failure is the result of aging; it is simply a "wearing out" process. For most cats, the early signs occur at about 10-14 years of age.

#### *How does it affect my cat?*

The kidneys are essentially filters through which the blood flows for cleansing. When disease or aging causes the filtration process to become inefficient and ineffective, blood flow to the kidneys is increased in an attempt to increase filtration. This results in the production of more urine. To keep the cat from becoming dehydrated due to increased fluid loss in the urine, thirst is increased; this results in more water consumption. Thus, the early clinical signs of kidney failure are increased water consumption and increased urine production. The clinical signs of more advanced kidney failure include loss of appetite, depression, vomiting, diarrhea, and very bad breath. Occasionally, ulcers will be found in the mouth.

#### *How is the diagnosis made?*

The diagnosis of kidney failure is made by determining the level of two waste products in the blood: blood urea nitrogen (BUN) and blood creatinine. A urinalysis is also needed to complete the study of kidney function.

Although BUN and creatinine levels reflect kidney failure, they do not predict what will happen tomorrow or next week. A cat with marginal kidney function may have normal blood tests. If that cat is stressed with major illness or surgery, the kidneys may fail, sending the blood test values up quickly.

#### *How is kidney failure treated?*

The goal of treatment is to restore function of the kidneys. But, we must recognize that your cat's kidneys have reached this point due to long-standing disease or aging; therefore, they will never be normal again. However, many cats still have enough functional kidney tissue so that treatment will be very rewarding.

Treatment is in two phases. The first phase is to "restart" the kidneys; it usually lasts 3-6 days. Large quantities of intravenous fluids are given to "flush out" the kidneys. This flushing process, called diuresis, helps to stimulate the kidney cells to function again. If enough functional kidney cells remain, they may be able to adequately meet the body's

needs for waste removal. Fluid therapy includes replacement of various electrolytes, especially potassium. Other important aspects of initial treatment include proper nutrition and drugs to control vomiting and diarrhea.

### *What will happen after the first few days of treatment?*

There are three possible outcomes due to the first phase of treatment:

- 1) The kidneys will resume functioning and continue to function for a few weeks to a few years.
- 2) The kidneys will resume functioning during treatment but fail again as soon as treatment stops.
- 3) Kidney function will not return.

Unfortunately, there are no reliable tests that will predict the outcome.

### *If my cat improves, is treatment concluded?*

No. Your cat's kidneys are still damaged; they will never be normal again. Without continued treatment your cat will soon be back in kidney failure. Therefore, home treatment is vital. Its goal is to keep the kidneys functioning as long as possible. This is accomplished with one or more of the following, depending on the situation:

1. **A special diet.** Diets that are formulated for kidney failure are low in protein. Although somewhat controversial, low protein diets seem to permit the kidneys to work less, therefore last longer. These diets are also lower in phosphates and are non-acidifying. These factors help to lower the amount of protein waste in the blood, control excessive phosphate buildup, and reduce pH imbalances; together they usually make your cat feel better. We can recommend a commercially prepared food that is formulated for kidney disease.
2. **Potassium supplementation.** Potassium is lost in the urine when urine production becomes excessive. A potassium supplement will replace that loss. Low potassium levels have been shown to further reduce kidney function. This is the second reason that a potassium supplement is recommended.
3. **Fluids given at home.** Once your cat is stabilized, fluids can be given under the skin (subcutaneously). This serves to continually "restart" the kidneys as their function begins to fail again. This is done once daily to once weekly, depending on the degree of kidney failure. Although this might not sound like something you can do, you will be surprised at how easily the technique can be learned and how well most cats will tolerate it.
4. **A drug for excess stomach acid.** Evidence indicates that excess stomach acid causes nausea and is therefore harmful to your cat's appetite. Drugs with this action are usually given only if appetite is improved while they are administered.
5. **A phosphate binder.** One of the secondary things that occurs in kidney failure is an elevation of the blood's level of phosphorus. This also contributes to lethargy and poor appetite. Certain drugs will bind excess phosphates in the intestinal tract so they are not absorbed, resulting in lower blood levels of phosphorus. If the special diet is not successful in maintaining normal phosphate levels in the blood, a phosphate binder is used.
6. **A drug for high blood pressure.** Many cats with kidney failure have high blood pressure. It will become normal in many cats following hospital treatment, but it remains elevated in others. These drugs are used only if needed.
7. **An anabolic steroid.** These drugs often stimulate the appetite. They are used if needed.
8. **A drug to regulate the parathyroid gland and calcium levels.** Calcium and phosphorus must remain at about a 2:1 ratio in the blood. The increase in blood phosphorus level, as mentioned above, stimulates the parathyroid gland to increase the blood calcium level by removing it from bones. This can be helpful for the sake of the normalizing calcium:phosphorus ratio, but it can make the bones brittle and easily broken. Calcitriol can be used to reduce the function of the parathyroid gland and to increase calcium absorption from the intestinal tract.
9. **A drug to stimulate the bone marrow to produce new red blood cells.** The kidneys produce erythropoietin, a hormone that stimulates the bone marrow to make red blood cells. Therefore, many cats in kidney failure have a low red

blood cell count, anemia. Epogen™, a synthetic form of erythropoietin, will correct the anemia in most cats. Unfortunately for some cats, the drug cannot be used long term because the immune system recognizes the drug as "foreign" and will make antibodies (immune proteins) against it.

***How long can I expect my cat to have a quality life?***

The prognosis is quite variable depending on response to the initial stage of treatment and your ability to perform the follow-up care. However, we encourage treatment in most situations because many cats will respond and have a good quality of life for up to four years.

***Is kidney transplantation possible?***

This procedure is being done at a few selected locations in the United States. Generally, the cat must still be in good condition and not ill from the kidney failure in order to be accepted for a transplant. Also, many transplant centers require that the owner adopt the cat which has donated a kidney for the procedure.

This procedure is not for everyone. The cost is often prohibitive and multiple medications must be given daily for the duration of the cat's life. Repeated blood tests are required to monitor function of the transplanted kidney and to monitor blood levels of the anti-rejection drug. Also, the anti-rejection drug is expensive. But, it is truly a cure for kidney failure.