

# Renal Disease

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## THE FACTS

Most people have two kidneys, although some people are born with only one. The kidneys are bean-shaped organs about four to five inches long. They lie on both sides of the spinal column behind the abdominal cavity.

Kidney disease, also known as renal disease, damages the kidneys by destroying tissue which reduces their function. When 50% to 80% of the kidney tissue is destroyed and not functioning, the condition is known as "renal insufficiency." When more than 80% of the tissue is destroyed, the condition is known as "renal failure" and when more than 90% of the tissue is destroyed the condition is known as "end-stage renal disease" (ESRD).

## THE KIDNEY'S FUNCTIONS

Healthy kidneys are very efficient. Every 20 minutes, all the blood in the body flows through them. In fact, one healthy kidney can carry out all the functions needed. This fact explains why a person can donate one of his or her kidneys to another person and still have normal kidney function.

### **Filtration of Waste**

The primary functions of the kidneys are to filter the blood, remove the waste products, and eliminate them from the body. The kidneys remove and excrete excess water as well as metabolic waste products. In addition to removing normal body wastes, the kidneys also excrete many drugs. If the kidneys did not remove and excrete the wastes, they could reach dangerous levels in the blood and damage the body.

### **Regulation of Fluid and Electrolyte Balance**

The kidneys regulate the retention and excretion of water and electrolytes (sodium, potassium, chloride, calcium, and phosphorus). The urine can become more dilute or more concentrated based on the body's needs.

### **Regulation of Blood Pressure**

There are several functions of the kidneys that regulate blood pressure. One is the excretion of sodium and another is production of a particular enzyme. A person with kidney failure tends to have problems with high blood pressure because of the kidney's inability to regulate it.

### **Hormone Secretion**

The kidneys secrete hormones that help regulate bone growth in addition to regulating the levels of calcium and phosphorus. Growth and maintenance of healthy bones involve many systems, and the kidneys play an important role. Another hormone produced by the kidneys regulates the production of red blood cells.

## CAUSES OF KIDNEY DISEASE AND RENAL FAILURE

There are many factors that can cause renal failure and many of the factors could be controlled. Some of the most common causes include:

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## **Diabetes**

Uncontrolled diabetes is the most common cause of renal failure. In poorly controlled diabetes, there is a high level of glucose in the blood. The high levels of glucose contribute to development of kidney disease.

## **Hypertension**

Hypertension, or high blood pressure, puts more stress on the blood vessels throughout the body. The stress can damage the small blood vessels in the kidneys, which then cannot filter wastes very well. Uncontrolled hypertension is the second leading cause of kidney failure.

## **Hereditary Diseases**

There are several types of kidney disease that run in families. The most common inherited kidney disease is polycystic kidney disease in which large cysts crowd out normal kidney tissue leading to renal failure. Hereditary diseases cannot be avoided.

## **Overuse and Allergic Reactions to Painkillers or Antibiotics**

Heavy use of ibuprofen (Advil®), acetaminophen (Tylenol®), and naproxen (Aleve®) can cause kidney inflammation that can lead to renal failure. Additionally, illegal drugs such as heroin and cocaine can damage the kidneys.

## **Infections and other disease conditions**

The *streptococcus* (strep) bacteria that cause strep throat can cause kidney disease if not adequately treated. Cancer can affect the kidneys and several other diseases can cause renal disease. They include sickle cell anemia, AIDS, hepatitis C, and lupus.

## **SIGNS AND SYMPTOMS OF RENAL FAILURE**

In most cases, the signs and symptoms of kidney disease occur slowly over a period of time. In addition, not everyone who has kidney disease will develop renal failure. The major signs and symptoms of renal failure include:

### » Changes in urination

There are varied types of changes in urination that may occur with kidney failure. The urine may be foamy or bubbly and the person may have difficulty urinating. In some cases, the person will urinate more frequently and in greater amounts with pale urine. As the disease progresses, the amount of urine output decreases and the urine is darker than usual. Sometimes it turns bloody.

### » Swelling, especially in the feet, ankles, and legs

When the kidneys fail, they do not remove sufficient fluid. The fluid is retained in the body and causes swelling.

### » Fatigue

Failing kidneys do not produce sufficient amounts of a hormone needed for making red blood cells. As fewer red blood cells are made, there is less oxygen in the blood and the person becomes anemic.

### » Itching

When the kidneys do not adequately filter the waste products from the bloodstream, they accumulate and can cause severe itching and skin rashes.

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## » Ammonia breath

One of the by-products in urine is ammonia. When failing kidneys are not able to excrete the ammonia, it can make the breath smell like ammonia and give the person a metallic taste in the mouth.

## » Shortness of breath

There are two reasons why a person with renal failure may develop shortness of breath. One reason is that the kidneys do not remove sufficient fluid from the body and it can accumulate in the lungs. The other reason is because of the reduced number of red blood cells which leaves the body without sufficient oxygen.

## » Nausea and lack of appetite

A severe build-up of wastes in the bloodstream can lead to lack of appetite as well as nausea and vomiting. This combination of symptoms often leads to weight loss.

## » Feeling cold and/or dizzy

The reduced number of red blood cells carrying oxygen can cause the person to feel cold all the time, even when the weather is warm. The reduced oxygen in the brain can make the person dizzy or have trouble concentrating.

## » High blood pressure

Diseased kidneys do not perform the functions that help regulate the blood pressure. As a result, these patients will often have high blood pressure.

## TREATMENT

Treatment for renal failure varies from person to person and most treatment is geared toward causes or symptoms. Controlling the blood sugar level in diabetics and controlling the blood pressure in patients with hypertension can help to slow the decline in kidney function. Unfortunately, for most patients with renal failure, kidney function will continue to decline. The rate of decline may be slowed, but will almost certainly continue until the patient experiences severe kidney failure (end-stage renal disease). Other treatments include:

## » Special diets

A special diet may help control the buildup of wastes and fluid and decrease the workload of the kidneys. Usually the diet is low in sodium and phosphorous, with limits on the amount of protein the person should eat. These diets are prescribed by the physician, usually working with a dietician, and may change as the disease progresses. Some patients with renal failure may have significant fluid restrictions.

## » Certain medications

Some medications seem to decrease the rate of decline in kidney function. There are also injections to improve the production of red blood cells.

## » Dialysis

Dialysis is a treatment that filters the blood and does some of the functions the diseased kidneys can no longer do. Patients can survive for many years with dialysis. There are two types of dialysis – hemodialysis and peritoneal dialysis. Patients who are receiving dialysis almost always have end-stage renal failure. They may urinate only scant amounts of urine and some patients will not urinate at all.

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- Peritoneal dialysis allows for the blood to be filtered inside the abdominal cavity. A catheter is placed through the abdomen and special solutions are allowed to flow into the peritoneal cavity. The solutions remain in the cavity for varying periods of time. While inside the cavity, the solutions gather waste products from the blood. As the solutions are drained off, they remove the waste products and extra fluids. Each period of putting the solutions in and allowing them to flow out is called an “exchange.” There are two methods of peritoneal dialysis that are done in the home:
  - Continuous Ambulatory Peritoneal Dialysis (CAPD) is usually done with four or five exchanges per day. It is the only type of dialysis that is completed without any machinery and is the most common form.
  - Continuous Cycling Peritoneal Dialysis (CCPD) uses a special machine to do the exchanges throughout the night while the patient is sleeping.
- Hemodialysis uses a machine (often called an artificial kidney) to remove the wastes and fluid. In order to use the machine, the patient's blood vessels must first be made accessible. Minor surgery is performed to join an artery to a vein in the forearm to make a bigger blood vessel. Often a plastic graft is used to join the two blood vessels. The resulting access is called an arterio-venous (A-V) shunt or fistula. [Note: it is important to avoid taking blood pressure in the arm with the A-V shunt.] Hemodialysis is usually performed at a dialysis center three times per week for three to four hours at a time.

## » Transplantation

Transplantation is a surgical procedure that places a healthy kidney from one person into the body of a patient with renal failure. The kidney may come from a person who has died, or it may come from a living donor. The kidney is connected to the patient's bladder and blood vessels and, if successful, will perform the functions of a healthy kidney. The transplant patient resumes urination and will have fewer dietary restrictions. The patient will need to take special medications to prevent the body from rejecting the kidney. Few patients have a living donor and most need to be on a waiting list until a suitably matched non-living donor is available.

## CARING FOR PATIENTS WITH RENAL FAILURE

The care provided to patients with renal failure will vary greatly, depending on the degree of failure and type of treatment. Components of care for all patients include:

- » Carefully reading and following the assignment sheet
- » Providing excellent skin care and oral hygiene
- » Working with the patient to pace activities to decrease fatigue
- » Assisting with medications as directed
- » Preparing food and assisting with diet as assigned, with meticulous attention to the special diet
- » Assisting the patient to select layers of clothing to prevent chilling, and
- » Encouraging the patient to get up slowly to prevent dizziness.

## OBSERVING AND REPORTING

The assignment sheet will often list specific findings to report to the nurse. If it does not, observe the patient and report the following:

- » Changes in urination, including decreased output
- » Swelling
- » Increased itching
- » Shortness of breath
- » Redness, drainage or foul smell around the peritoneal dialysis catheter, and
- » Noncompliance with diet or medications.

## KEY POINTS TO KEEP IN MIND

- » Many patients with renal failure lead successful productive lives while receiving dialysis.
- » The care may be different for each patient with renal failure. It is essential for home health aides to review the assignment sheet carefully and consult with the supervisor if the assignment is not clearly understood.
- » Patients with renal failure must carefully follow their prescribed diets and medication regimens.
- » Poorly controlled diabetes and hypertension are by far the two most common causes of renal failure, although there are many other causes.

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## CASE STUDY

James is a home health aide making his first visit to Mr. Spate, who is 66 years old. Mr. Spate recently returned from the hospital where he had an A-V shunt placed so he can begin hemodialysis. Mr. Spate has had renal failure which worsened over the past several months. He recently began having marked weakness and fatigue and noticed that he was hardly urinating at all. His physician told him he now has end-stage renal disease.

During his bath, Mr. Spate tells James that he wishes he could relive the past ten years. "I just didn't take my diabetes very seriously. I ate pretty much what I wanted and didn't always take my insulin. In fact, I was in the hospital several times with high blood sugars." As James listens patiently Mr. Spate goes on, "As if my diabetes wasn't bad enough, I also had high blood pressure and didn't take my medicine like I should have." During the rest of the bath, Mr. Spate tells James how awful he has felt for the last several months. "I just kept getting worse and worse. I didn't want to eat, my feet swelled up every evening, and I was just too tired to do anything. I hope this dialysis thing will help."

James notices several scratch marks on Mr. Spate. Some of them look as if they have bled, and the surrounding skin is reddened. He mentions the scratches to Mr. Spate who says he itches all over and can't help scratching. Mr. Spate tells James he feels a little dizzy while getting out of bed. "But that's not unusual," he says. James completed his assignments and left to see his next patient.

## THINK ABOUT IT

- » How many symptoms of renal failure can you identify in Mr. Spate?
- » List some of the information that James should include on his visit note. Does James need to contact the supervisor? If so, what should he report?
- » What are the two most likely causes of Mr. Spate's renal disease?
- » What other treatment options might have been discussed with Mr. Spate?

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DIRECTIONS: READ EACH QUESTION CAREFULLY. THEN, DETERMINE THE BEST ANSWER. CHECK THE CORRESPONDING BOX ON YOUR ANSWER SHEET. DO NOT WRITE ON THIS POST-TEST.

1. Which of the following is not a function of the kidneys?
  - a. Regulating fluid balance
  - b. Absorbing Vitamin B<sub>12</sub>
  - c. Filtering wastes from the blood
  - d. Regulating blood pressure
  
2. What is the most common cause of renal failure?
  - a. Diabetes
  - b. Multiple sclerosis
  - c. Arthritis
  - d. Cancer
  
3. One healthy kidney could carry out all the functions needed for the body.
  - a. True
  - b. False
  
4. Which of the following findings should be reported to the supervisor?
  - a. Swelling of the feet and ankles
  - b. Increased itching or scratching
  - c. Changes in urination
  - d. All of the above
  
5. Renal failure is often treated by all of the following except:
  - a. Special diet
  - b. Dialysis
  - c. Radiation therapy
  - d. Medications
  
6. Why is excellent skin care especially important for patients with renal failure?
  - a. Because they always have a lot of skin tears
  - b. Because they always have very dry skin
  - c. Because they sweat more than other people
  - d. Because waste products accumulate on the skin

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7. Which of the following is true about patients on dialysis?
- a. Most of them will not live more than two years while receiving dialysis.
  - b. Many of them lead successful lives while receiving dialysis.
  - c. The care for all patients receiving dialysis is the same.
  - d. All patients must go to a dialysis center to receive dialysis.
8. Many of the causes of renal disease can be controlled except:
- a. Diabetes
  - b. High blood pressure
  - c. Heredity
  - d. Overuse of painkillers
9. Which of the following statements is true about kidney transplants?
- a. Most patients awaiting transplants are placed on a waiting list to receive a suitable kidney.
  - b. Most patients have a family member who will donate a kidney.
  - c. Kidneys must be taken from a live donor.
  - d. Once a kidney transplant is successful, the patient does not have to take any more medications.
10. Hereditary diseases and infections are by far the most common causes of renal failure.
- a. True
  - b. False

– END –



# MONTHLY INSERVICE ANSWER SHEET

In-service Month \_\_\_\_\_ Year \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_

1. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

2. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

3. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

4. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

5. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

6. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

7. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

8. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

9. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

10. a. \_\_\_ b. \_\_\_ c. \_\_\_ d. \_\_\_

