

Peritoneal Dialysis

A treatment option for kidney disease

Class Goals

1. Understand the purpose and basic principles of continuous ambulatory peritoneal dialysis (CAPD).
2. Understand the purpose and basic principles of continuous cycling peritoneal dialysis (CCPD).

Overview

Peritoneal dialysis (PD) uses the lining of the abdomen as a filter to remove wastes and extra fluids from blood.

To do this, a *catheter* (tube) is inserted in the belly wall.

What is PD?

Your abdominal cavity (belly) is lined with a membrane called the *peritoneum*. It surrounds and protects your stomach, bowels, and other organs. The peritoneal membrane has many tiny holes that can be used to filter waste products from your blood. It becomes the dialyzer in PD.

Peritoneal dialysis (PD) works **inside** the body. It is a daily treatment. It can be done with or without a machine (called a *cycler*). Most people can do PD by themselves and do not need a helper.

Types of PD

There are 2 types of PD: *continuous ambulatory peritoneal dialysis* (CAPD) and *continuous cycling peritoneal dialysis* (CCPD). Both are daily treatments based on a series of *fills*, *drains*, and *dwells* (how long the dialysate fluid stays in your belly before you empty it) in a 24-hour period.



Since most people can do PD by themselves, this type of treatment can help you feel more independent.

- In **CAPD**, sterile fluid is placed through the catheter into your belly. It stays in your belly about 4 to 8 hours before it is drained. Your belly is then refilled with fresh fluid.

CAPD exchanges must be done 4 to 5 times a day. They can be done any place that is clean and well-lit. CAPD is sometimes called *intermittent peritoneal dialysis* (IPD).

- **CCPD** uses a machine to fill and drain your belly. This is done for 8 to 10 hours while you sleep. During the day, 1 or 2 manual exchanges (see CAPD) may also be needed. CCPD is sometimes called *automated peritoneal dialysis* (APD).

Your dialysis center will teach you how to do these procedures. It will also provide you with support and supplies.

What kind of access is needed for PD?

Before starting PD, a permanent access *catheter* (small, soft plastic tube) must be placed into the peritoneal cavity by a surgeon. Clean dialysis fluid will be safely placed into the peritoneal cavity through this catheter. The catheter is both inside and outside your body (see Figures 10 and 11).

The piece of catheter that extends outside the body is about 3 to 4 inches long. It is about ¼ inch in diameter, about as wide as a pencil. It is placed about 3 to 4 inches away from the belly button, and can be hidden by most clothing. An extra piece of tubing is added to the catheter so that the total length is about 12 inches.

Most times, the peritoneal catheter is placed 2 to 3 weeks before you will start PD. This allows the surgical wounds to heal before you use the catheter for PD.

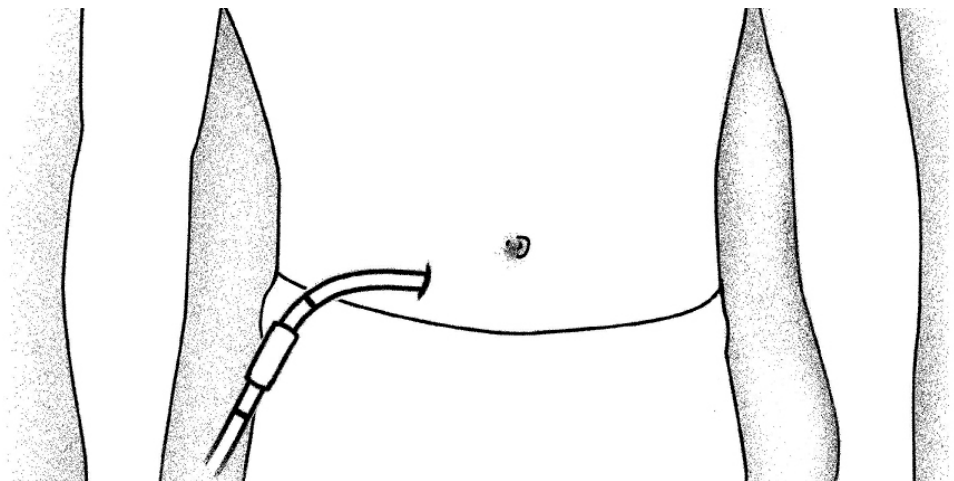


Figure 10: Catheter access

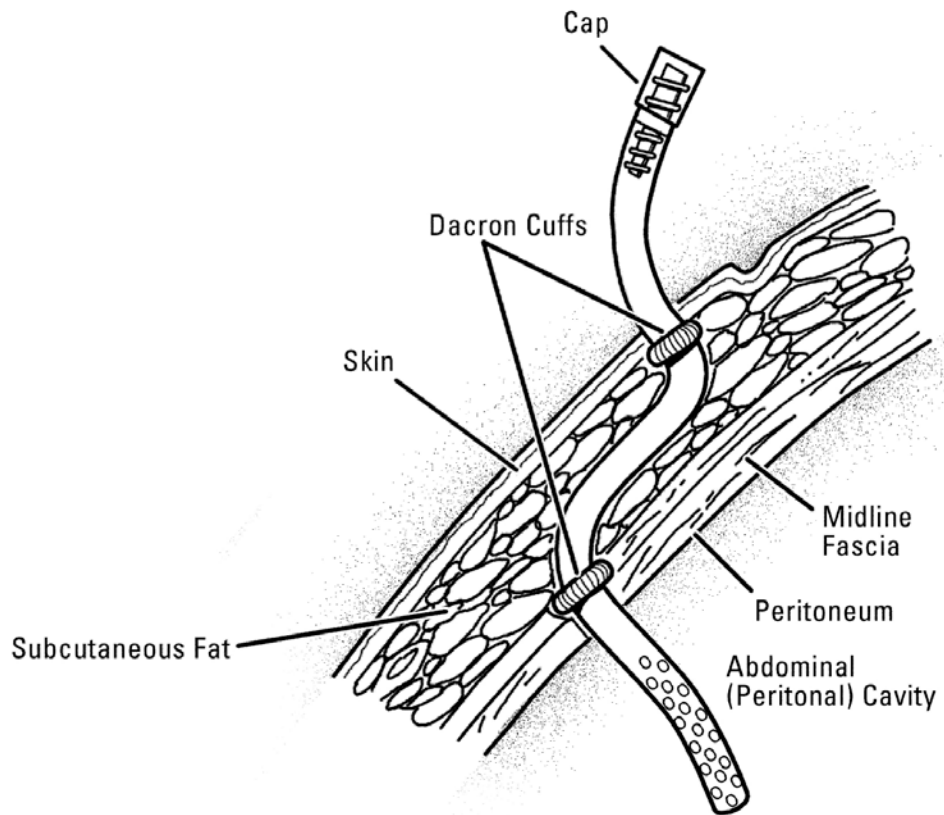


Figure 11: The catheter extends from the peritoneal cavity, through the layers of skin, to outside the body.

How does PD work?

Once a PD catheter is placed and the surgical wounds around it have healed, dialysis can begin.

- The catheter carries dialysate fluid into the *peritoneal cavity* (belly). Most adults can hold 2 to 3 quarts (2 liters) of fluid in their bellies. The amount of dialysate fluid you use is based on your body size.
- The fluid stays in your belly while waste products and fluids are filtered from your blood through your peritoneal membrane. Waste products pass from the bloodstream, through the peritoneal membrane, and into the dialysate fluid by processes called *diffusion* and *osmosis* (see Figure 12).
- Over time, the dialysate becomes saturated with waste products and fluid. It must be replaced with fresh dialysate fluid throughout the day. Each time the belly is drained then refilled with fresh dialysate is called an *exchange*. The number of times the fluid is exchanged will depend on which type of PD you choose and your prescription.

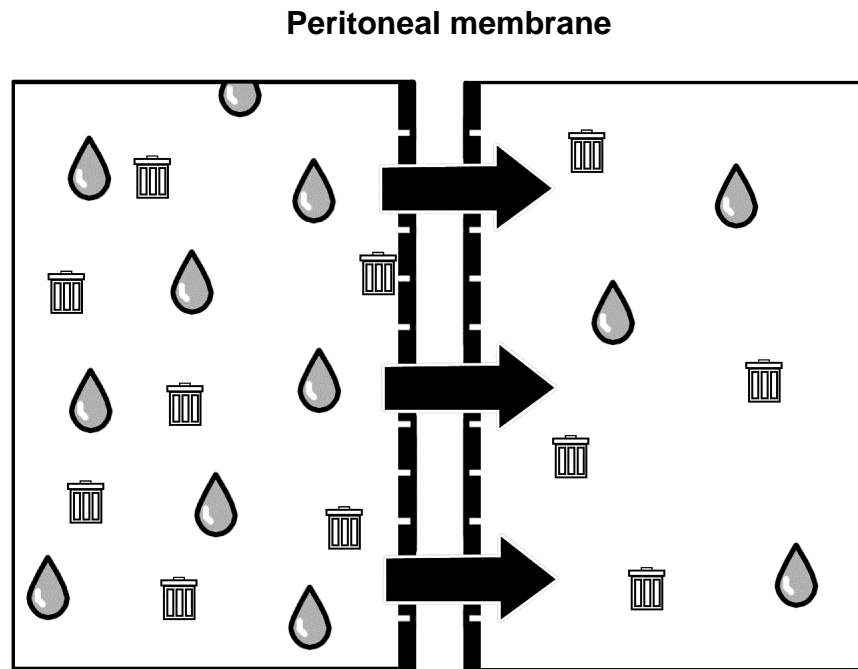


Figure 12: Diffusion and osmosis: Waste products pass from the bloodstream, through the peritoneal membrane, and into the dialysis solution.

With PD:

- Waste products and fluid are removed much more slowly than with hemodialysis. Some people find this slower removal of fluids easier on their body.
- Waste products and fluids are removed from the body 24 hours a day.
- People who are on PD always have some fluid in their belly.

If you choose to be on PD, your kidney center will provide training and support on how to do the treatments safely yourself. The length of training will vary among centers, but it should be less than 2 weeks. The supplies and equipment will be delivered to your home once a month.

What is continuous ambulatory peritoneal dialysis (CAPD)?

CAPD is the most common type of PD. If you choose PD, you will most likely start with CAPD. It can be done in any place that is clean and well-lit. Exchanges are done every 5 to 6 hours during the day, with a long dwell overnight.

For an exchange, you will need a fresh bag of dialysate. It comes with sterile tubing to connect to your catheter and an empty bag to drain into.

CAPD uses gravity to drain and fill the fluid from your peritoneal cavity. Once the tubing is connected to your catheter, the fresh bag is hung on an IV pole above your head while the empty drain bag is lowered to the floor. Clamps on the tubing control whether your belly is being filled or drained. The fluid that has been in your belly for the past several hours is drained into the empty bag (see Figure 13). This takes about 15 minutes.

When your belly is empty, fresh dialysate can flow in. When your belly is filled with fresh dialysate, you will disconnect your catheter from the tubing and then place a new sterile cap on your catheter. The used dialysate can be drained into the toilet.

Each exchange takes about 30 minutes. You can do your normal activities in the time between exchanges. Many people schedule their exchanges around meals and bedtime.

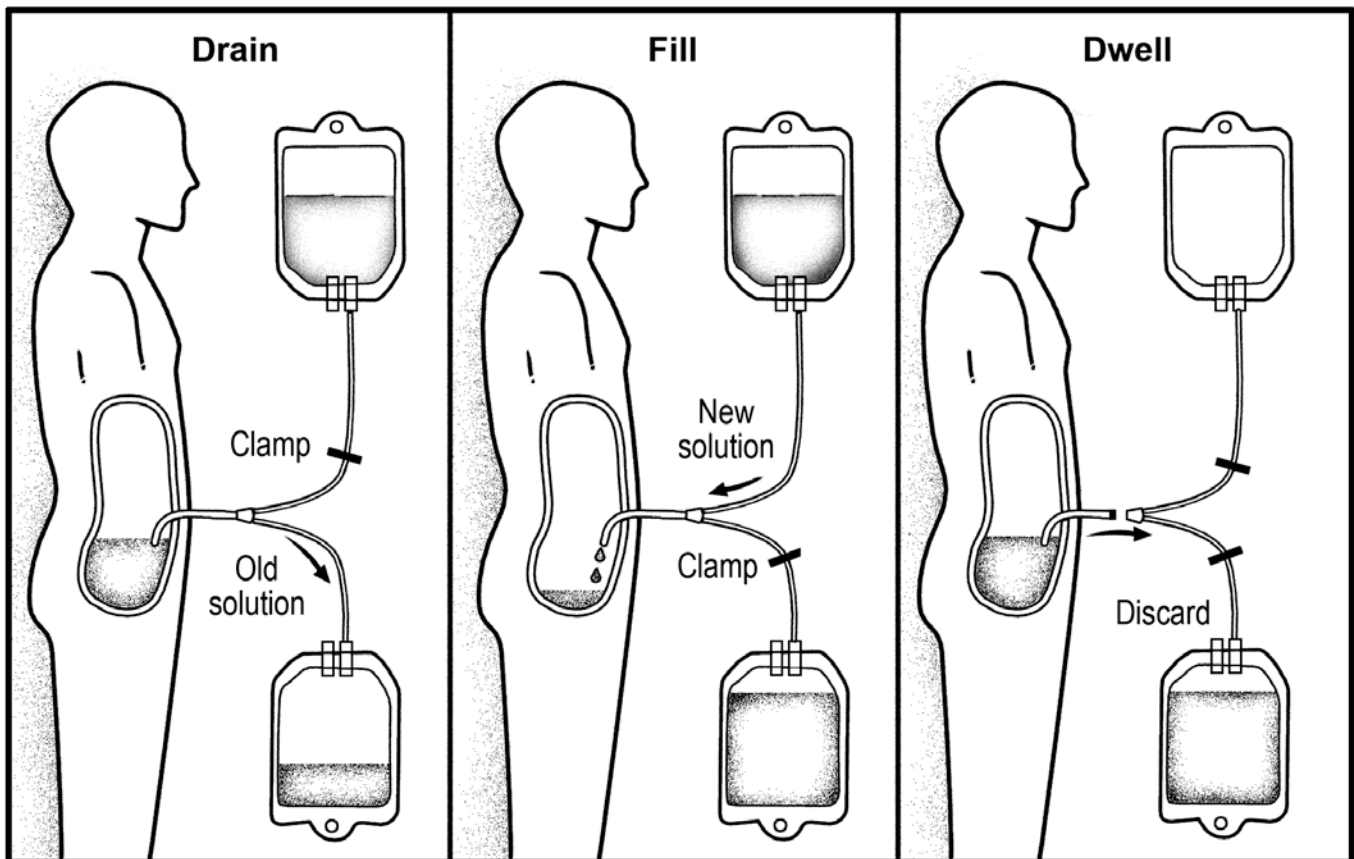


Figure 13: CAPD exchange

What is continuous cycling peritoneal dialysis (CCPD)?

CCPD is often used if you need more dialysis in a day than can be delivered by CAPD, or if you do not have time or space during the day to do an exchange. With CCPD, your catheter is connected to a machine called a *cycler* for 9 to 11 hours at a time (see Figure 14). Most times, CCPD is done overnight while you sleep.

The cycler must be set up each night with new tubing and fresh dialysate bags. Your doctor will prescribe the amount of fluid to use for each cycle and the number of cycles to program into the cycler. Your kidney center nurse will teach you the correct way to do this. You will also learn how to program the machine and what to do if an alarm sounds.

Treatment begins when you attach your catheter to the cycler at bedtime and drain. During the night, the cycler will do 3 or more exchanges.

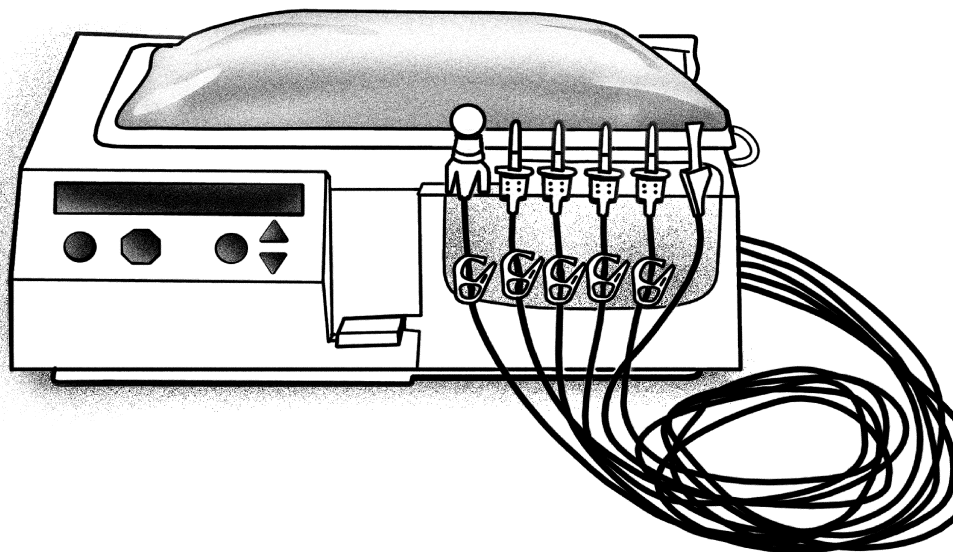


Figure 14: CCPD machine – the cycler

When it is time to come off dialysis, the machine will fill your belly with fresh dialysate. This solution will stay in your peritoneal cavity and keep cleaning your blood during the day. This is your *long dwell*, similar to the nighttime exchange on CAPD.

Some people on CCPD also have to exchange the fluid in their bellies once or twice during the day. Your kidney doctor will prescribe how often you need to do this exchange. It depends on the amount of waste products and fluids that need to be cleaned out of the blood.

What are the risks with PD?

Peritonitis

Care must be taken to prevent bacteria (germs) from entering the peritoneal cavity. You cannot see bacteria, but they are always around us.

Peritonitis is an infection of the peritoneal cavity. You will learn the signs of peritonitis in this class. You will also learn the safe way to do PD procedures to avoid infections.

Bacteria can enter the peritoneal cavity in 3 ways:

- Through the catheter tube
- Along the outside of the catheter where it enters the body
- A leak from your bowels into the peritoneal space

To prevent infections, closely follow the exchange procedures and take proper care of your catheter (see Figure 15). Your dialysis center can treat you for peritonitis if it occurs. Most patients can be treated at home and do not need a hospital stay. Repeated peritonitis can decrease how well your peritoneal membrane can clean your blood.

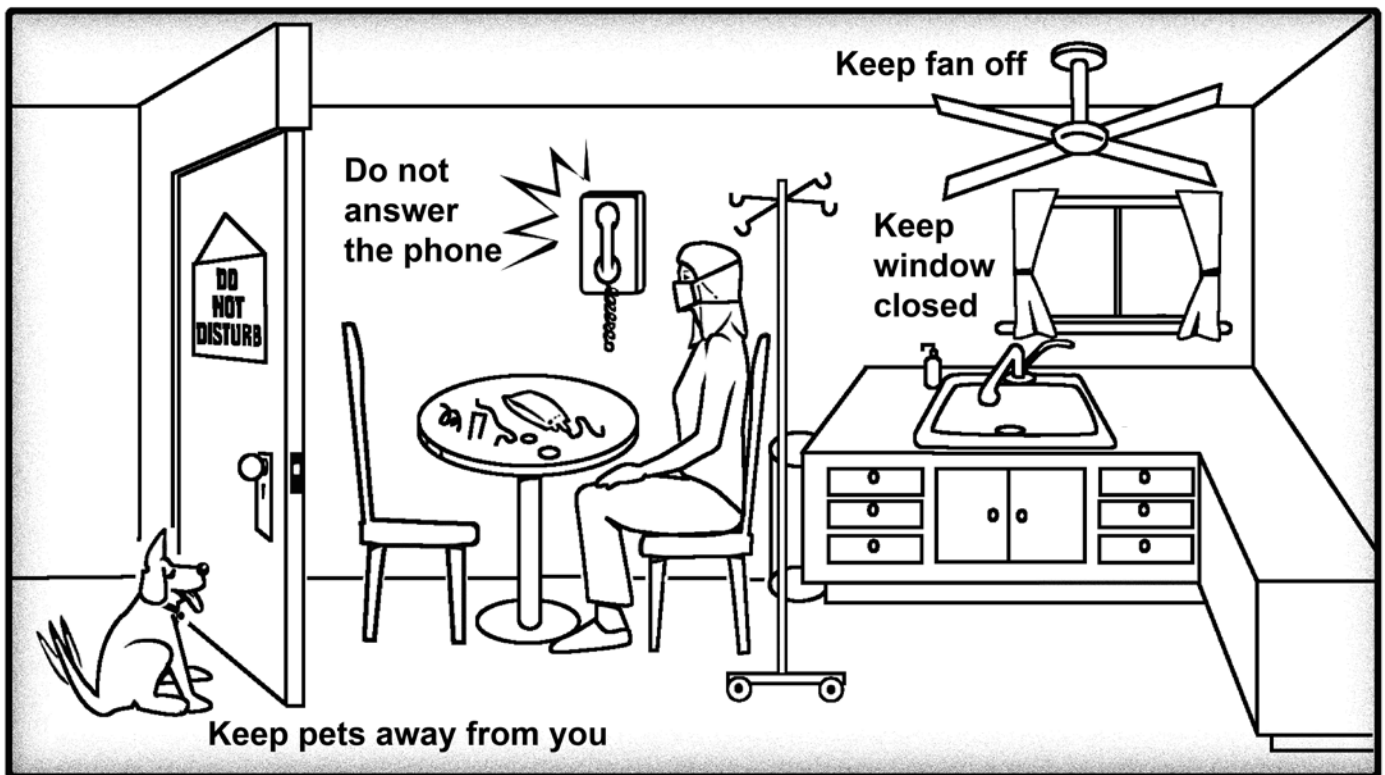


Figure 15: This drawing shows things you can do to help keep germs out of your peritoneal cavity while you are doing PD.

Hernia

A *hernia* occurs when tissue from inside the abdomen bulges through a weak spot in the abdomen. For some patients on PD, having dialysate in their belly all the time may increase their risk of getting a hernia.

Hernias are more common in men than women. They occur most often in the groin, at the belly button, and along a surgical line.

Fill and Drain Problems

Fill and drain problems can occur when you are on PD. Sometimes they are caused by a kink or a twist in the catheter or tubing.

Constipation can also cause drain problems. We encourage people on PD to take a stool softener daily to keep their bowel movements regular.

From time to time, the catheter may move out of position. If this happens, an X-ray may be needed to see what the problem is. At times, surgery may be needed to put the catheter back in the correct place.

Ultrafiltration Problems

When not enough fluid is removed and the extra fluid stays in the body tissues and/or lungs, it is called an *ultrafiltration* problem. If this occurs, you will need to do one or more of these things to fix the problem:

- Do more exchanges
- Use a stronger strength of dialysate to remove the fluid
- Reduce the amount of fluid you drink in a day

Exit Site Infection

The skin around your PD catheter may become infected. This is called an *exit site infection*. To help prevent an exit site infection:

- Wear a bandage over the catheter.
- Gently wash the site every day the way your nurses taught you. (See Figure 16.)



Figure 16: Gently wash the skin around your PD catheter every day to help prevent an exit site infection.

What are your responsibilities if you choose PD?

If you choose peritoneal dialysis to treat your kidney disease, you must:

- Do all the exchanges as prescribed by your doctor
- Follow procedures exactly the way you were taught
- Take care of your catheter
- Eat the foods that you are taught
- Take your medicines as prescribed
- Talk with your healthcare team about problems, concerns, or questions
- Have a monthly follow-up visit at your dialysis center for lab work and review
- Have a monthly follow-up visit with your kidney doctor

Pros and Cons of Peritoneal Dialysis

Both CAPD and CCPD

PROS	CONS
<ul style="list-style-type: none">• Self-care at home• A sense of control• No dialysis needles• Flexible schedule• Less stress on the body than hemodialysis• A more flexible eating plan• Can travel more easily	<ul style="list-style-type: none">• Daily treatments• Body image changes• Weight gain or feeling full• Storage space at home or work for supplies needed• No swimming in lakes• No soaking in baths or hot tubs

CAPD

PROS	CONS
<ul style="list-style-type: none">• Can set own daily schedule• No machine needed	<ul style="list-style-type: none">• Exchanges may interrupt your day

CCPD

PROS	CONS
<ul style="list-style-type: none">• Most of treatment is done while you are sleeping	<ul style="list-style-type: none">• Nightly treatments last 8 to 10 hours• Machine alarms may disturb your sleep• More storage space for supplies needed

Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.
