STAGE
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Peritoneal dialysis

What you need to know

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Contents

What is peritoneal dialysis?

Peritoneal dialysis (PD) is a treatment for people who have kidney failure.

Healthy kidneys clean wastes from blood and remove extra fluid from the body. But when your kidneys are not working well, wastes and extra fluid can build up in your blood and make you sick. This can cause:

- nausea
- trouble sleeping
- poor appetite
- loss of energy
- hiccups
- dry, itchy skin
- weight loss

- irregular menstrual periods
- muscle cramping, especially at night
- swelling
- anemia (low red blood cell count)
- trouble breathing

Why do I need PD?

You need treatment because your kidneys no longer clean enough wastes from your blood or remove extra fluid from your body. Even though people with kidney failure may still have some kidney function, it's not enough, and without treatment, you will die.

Are there other treatments for kidney failure besides PD?

Yes, there are two other treatments for kidney failure. They are:

HEMODIALYSIS

In hemodialysis, your blood flows through a machine that has a filter which cleans the blood. This machine is called a dialyzer or artificial kidney.

Hemodialysis is usually done three times a week, several hours each session. It can be done at a dialysis center or at home. Two needles are inserted into your vein during each dialysis treatment to draw your blood into the dialyzer.

KIDNEY TRANSPLANT

In transplantation, a healthy kidney is put inside your body to do the work of your own kidneys.

Are there different types of PD?

Yes. The major ones are:

- **Continuous Ambulatory PD (CAPD).** With CAPD, you do the exchanges yourself three to four times a day.
- **Automated PD (APD).** With APD, a machine called a cycler does the exchanges automatically while you sleep. You may also need to do one exchange during the day if your kidney function decreases further.

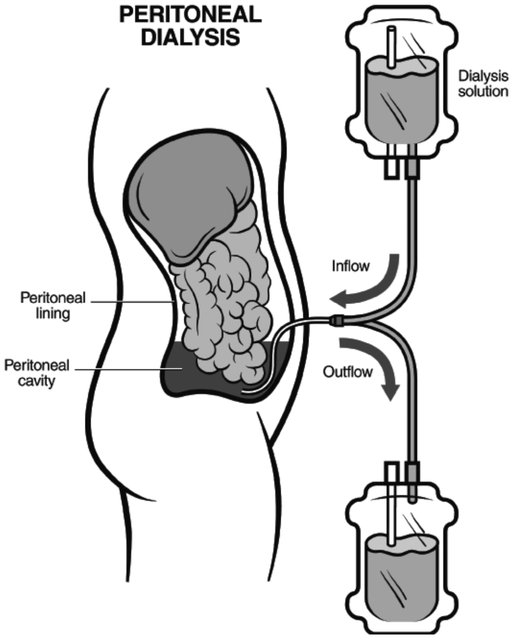
CAPD and APD are both done during the night and day. Your treatment times are decided by your and your doctor and are included in the physician's orders.

Patients are usually trained on CAPD first before learning how to use the cycler for APD and both types can be done at home, work, or while travelling.

How does PD work?

A soft tube, called a *catheter,* is placed in your belly. This is done by minor surgery. This catheter makes it possible for you to easily connect to a special tubing which allows two to three quarts of a cleansing fluid to flow into your belly. The cleansing fluid is called *dialysate*. It takes about 10 minutes for the dialysate to fill your belly.

What happens next is an amazing process.



The lining of your belly (called the peritoneum) acts as a natural filter. It lets the wastes and extra fluid in your blood pass through it into the cleansing fluid. At the same time, the lining of your belly holds back the important things your body needs, like red blood cells and nutrients.

To do its job, the dialysate must stay in your belly for a few hours or more, depending on your body size and how much waste has to be removed. This time is called your *dwell time*.

With CAPD, when the filling is done, the catheter is capped so that it doesn't leak. After your dwell time, you drain the cleansing fluid from your body into an empty bag. You discard the bag. You then repeat the in-and-out process a number of times during the day, using fresh dialysate. The process of exchanging bags of dialysate is called an *exchange*. With APD, a cycler machine does exchanges for you while you sleep.

How will I learn how to do PD?

The training staff at your dialysis center will teach you everything you need to know, including how to do exchanges, order supplies, clean your catheter, and guard against infection. Once you and the staff are comfortable with your ability to do PD alone, you can start doing your own treatments at home.

How will I know how much dialysis I need?

The amount of dialysis needed is different for everyone. It is based on many factors, including your weight, how much kidney function you still have, your overall health, and the results of your lab tests. Your doctor will give you a dialysis prescription that is designed just for you. Your prescription will tell you:

- how many exchanges you need to make each day
- how long the dialysis fluid needs to stay in your belly (your dwell time)
- what type and amount of dialysis fluid you need to use for each exchange

What will my dialysis prescription be based on?

Your doctor will base your prescription on:

YOUR SIZE

Large, muscular people may need more frequent exchanges or larger bags, which means that more dialysis fluid goes into your belly.

YOUR REMAINING KIDNEY FUNCTION

How much dialysis you need is based on how much kidney function you have left. Your doctor or dialysis care team should measure your remaining kidney function. This is measured by a blood test and 24-hour urine collection. It should be checked within the first month after starting dialysis and every four months thereafter, if your urine output is stable.

However, if your urine output is decreasing (you are not peeing as much or as often), your remaining kidney function should be checked every two months. You should tell your doctor whenever you notice your daily urine output has become less.

YOUR NUTRITIONAL HEALTH

How well you feel on dialysis may be affected by how well you eat. Your dietitian will help you plan a diet that gives you the right amount of nutrients.

YOUR GENERAL HEALTH

If you are getting enough treatment, you should feel well, have a good appetite, and have enough energy to do many of the activities you enjoy. You should tell your doctor if you:

- are often nauseous
- have a poor appetite
- cannot taste
- are feeling too tired for your daily activities

This may mean you have other health problems or that you are not getting enough dialysis. If so, your doctor may need to change your dialysis prescription or other medical care that you are receiving.

YOUR PERITONEAL EQUILIBRATION TEST (PET)

This test is done within 4 to 8 weeks after starting PD. It measures how well your peritoneal membrane is working and helps your doctor decide how:

- Many exchanges you need each day
- Long the dialysis fluid should stay in your belly
- Much and the type of dialysis fluid you need

Tips

Getting the best results for your dialysis treatment depends on how well you follow your prescription.

Make sure to do the following:

- Use all your prescribed exchanges
- Follow the prescribed amount of time (dwell time) you keep the dialysis fluid in your belly
- Use the full amount of dialysis fluid prescribed for you
- Prevent infections by doing your exchanges exactly as you were taught
- Take all your medications exactly as ordered by your doctor
- Follow your diet and fluid allowances (too much fluid in your body can cause swelling, shortness of breath, and increased blood pressure)
- Report any problems to your doctor or dialysis care team
- Do not be afraid to tell your dialysis care team exactly how you do your exchanges (this is the best way to make sure that you are doing them correctly)

Will my dialysis care team monitor my treatments?

Yes. Your dialysis care team will measure your treatments regularly with lab tests. This tells them if your treatment is removing enough wastes from your blood.

The test that is used to check your “delivered dose” of dialysis is called Kt/Vurea (pronounced “kay- tee over vee-yur-ee-a”). Your total Kt/Vurea from the dialysis and your remaining kidney function should never be less than 1.7 per week.

How often should my treatments be measured?

Your delivered dose of dialysis should be measured every four months. This measurement should be done more often when your:

- PD prescription is changed
- Dialysis care team feels it is needed
- Kidney function levels have gone down

To measure your delivered dose of dialysis, your dialysis care team may ask you to bring to the dialysis center all the dialysis bags you used over a 24-hour period, or just a sample from each of the used bags.

You may also be asked for a 24-hour urine collection. Both the urine and the dialysate collections are important ways to measure your total dose of dialysis.

What if my overall health happens to get worse?

Tell your doctor. Your dialysis care team will do some tests to find out why. They may check to see if you’re:

- Doing all your exchanges as prescribed
- Having other health problems not related to kidney failure and dialysis

They will also check to see is your peritoneal membrane is working well. Sometimes, the membrane may not work as well if you have had serious infections, or if you have been on PD for several years.

When this occurs, your doctor may need to change your dialysis prescription. If your remaining kidney function has decreased too much, your doctor may want you to:

- Increase the number of bags you use each day
- Use a cycler
- Switch to hemodialysis

Will I need to follow a special diet?

Yes. Getting the right nutrients and balancing fluids is as important to your health as getting the right amount of dialysis. The registered dietitian at your dialysis center will help you plan your diet to make sure you get the right amount of protein, calories, and other important nutrients. You may also need to:

- Limit how much sodium (salt) you eat
- Take nutritional supplements

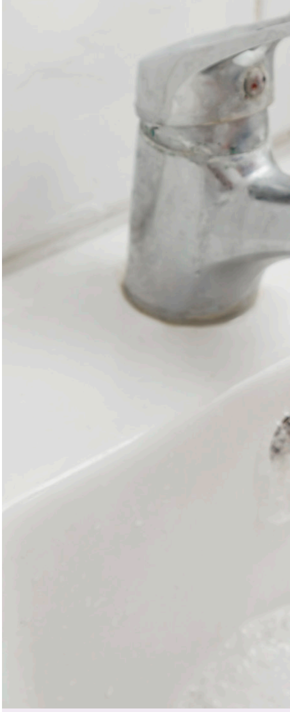
Tip

Because your dialysis fluid contains sugar, you may have a tendency to gain weight. Your dietitian can help you plan your diet to get the right amount of calories and keep up the right weight for you. If you have diabetes, your dosage of insulin or other medications may need to change.

What is peritonitis?

One thing you have to be very careful about in PD is peritonitis, an infection of the peritoneum (the lining of your belly). Peritonitis happens when germs get into the peritoneal cavity through the catheter. It is treatable with antibiotics, but it’s important to get it treated promptly. When doing an exchange:

- Make sure the area where you do your exchange is clean
- Make sure you and anyone else in the room wears a surgical mask
- Do not allow children or pets into the room
- Close all doors and windows and turn off any ceiling fans or air conditioners
- Gather all your supplies before you start your exchange
- Scrub your hands with soap for at least two minutes before each exchange (your dialysis care team can tell you the right kind of soap to use)
- Dry your hands with a disposable paper towel



- Do not touch anything unrelated to your treatment, not even your skin or your hair (if you do touch something, scrub your hands with soap for two minutes again before continuing)
- Avoid coughing or sneezing on your sterile supplies (if you do you must start the process over with new supplies)

Make sure you do your exchanges exactly as taught by your training program. Don't try anything different without asking your dialysis care team about it.

What are the signs of peritonitis?

The main signs of peritonitis are:

- a cloudy dialysate bag when you are draining out the used fluid
- unusual stomach pain, either mild or severe
- fever or chills

If you notice any of these signs, call your doctor or dialysis center right away. Getting prompt treatment for peritonitis is very important.

If you do not get prompt treatment, the infection can get worse and you may have to go to the hospital. In addition, the infection may scar your peritoneal membrane, making PD less effective.

In severe cases, you may have to change to hemodialysis.

Are there any other infections I should watch for?

Infections can also occur at the place where the catheter leaves your skin, called your *exit site*. You should clean this area at least once a day with soap and water. You should also check your *exit site* and catheter every day. If problems occur, you can often catch them in the early stages. Signs of exit site infection are:

- Redness, swelling, or bulging around the exit site
- Tenderness, pain, or pus at the exit site

Tips

Taking good care of your catheter is also important to prevent infections and have good results on PD.

Here are some tips for routine catheter care:

- Check your catheter every day for signs of cracking or pulling
- Do not wear tight clothes and belts around the exit site
- Wash your hands with soap and water for at least two minutes and dry them with a disposable paper towel before handling your catheter, and before and after an exchange is made.
- Tape the catheter down to your skin
- Keep the catheter away from scissors or other sharp objects.
- Cleanse the catheter thoroughly with a wash cloth and soap every day
- Keep a special dressing over the exit site if your dialysis care team tells you
- Do not allow tugging or pulling of your catheter

What if I have questions or problems?

Once you have learned all you need to know, your PD supplies will be delivered directly to your home and you will be ready to start your treatment. You will continue to visit your dialysis center for regular checkups and lab tests. At these visits, your doctor and dialysis care team will check:

- Your overall health and nutritional health
- Any symptoms you have that indicate you may not be getting enough dialysis
- How well you are doing with your exchanges
- The results of other important tests (see "What Your Tests Measure" on page 24)

In addition, your center will always be just a phone call away if you have any problems. You will be the primary person responsible for your own care. So be sure to call your doctor or dialysis care team if you notice any problems. See "Checking for problems" on the following pages.

Checking for problems

WEIGHT

What to Check: *Weigh yourself* each day at about the same time.

Signs of Possible Problems: A sudden weight gain along with swelling, shortness of breath, and an increase in blood pressure is probably due to too much fluid in your body.

A gradual weight gain without swelling, shortness of breath and an increase in blood pressure may be due to an increase in muscle or fat.

Loss of weight with dizziness and low blood pressure may signify that there is too little fluid in your body.

What to Do: Make sure to follow your diet and fluid allowances. Speak to your doctor and dietitian about your diet, fluid intake, medications, and dialysis prescription.

Speak to your dietitian about whether you need to change your intake of calories.

BLOOD PRESSURE

What to Check: *Check your blood pressure* and pulse every day.

Signs of Possible Problems: An increase in blood pressure and pulse may be due to too much fluid weight gain.

What to Do: Follow your sodium (salt) and fluid allowances to avoid too much fluid weight gain.

Your doctor may want to change your medications to better control your blood pressure.

DIALYSATE

What to Check: *Check how your dialysate* looks when you drain it out.

Signs of Possible Problems: Your dialysate should be clear and yellow in color. Cloudy dialysate is a sign of infection. You should be able to see the printed words on the bag through the solution. If you can’t, your dialysate is cloudy.

Whitish strands in the dialysate are little clots of protein and can get large enough to block your tubing or PD catheter. To prevent this, call your doctor if you notice any whitish strands in your dialysate.

Pinkish appearing dialysate means that some blood is leaking into the dialysis fluid. Some women notice this with their monthly period. It may also occur if you have been exercising or lifting something heavy. Do not be concerned about a small amount of blood—if it occurs with a monthly period or after rigorous exercise. However, watch the fluid closely and call your dialysis center if it becomes more pinkish or red.

What to Do: Call your dialysis center if you see whitish strands in the dialysate. You may need to inject a blood thinner called heparin into your fresh dialysate to clear the fluid; your nurse will tell you how to do this.

INFECTION

What to Check: *Check yourself for signs of infection.*

Signs of Possible Problems: Unusual stomach pain, fever, or cloudy dialysate could mean you have an infection called peritonitis. Peritonitis can become serious very quickly.

What to Do: Call your doctor or dialysis center right away if you see signs of peritonitis (see page 18). If you have peritonitis, follow your doctor's instructions carefully and take all the antibiotic medications ordered for you.

What do tests measure?

Kt/Vurea measures your delivered dose of dialysis. It tells whether you are receiving the right amount of dialysis. Your total Kt/Vurea from the dialysate and your remaining kidney function should be no less than 1.7 per week.

Albumin and **normalized protein nitrogen appearance (nPNA)** are measures of your nutritional health. The test results show if you are getting enough protein and calories from your diet.

Average daily weight gain is the amount of fluid weight you gain each day between dialysis treatments. If you do not follow your fluid and salt limits between treatments, you may gain too much fluid weight.

Calcium and **phosphorus** are two minerals that are important for bone health. Having too much or too little amounts of these minerals in your blood can lead to loss of calcium from the bones and increased risk of heart and blood vessel disease.

Estimated glomerular filtration rate (eGFR) is a calculation that measures how well your kidneys are working. Your eGFR can be calculated using the results of your blood creatinine test, your age, and gender.

Hemoglobin is the part of red blood cells that carries oxygen to your tissues. If your number is too low, you have anemia, and you will need to take one or more medicines to raise the red blood cell level in your body.

Parathyroid hormone (PTH) is made by four small parathyroid glands, which are located in your neck. If these glands make too much PTH, you may lose calcium from your bones. Over time, this can weaken your bones and cause them to break more easily.

Pre-dialysis and **post-dialysis blood pressure** should be taken each time you receive dialysis. Your blood pressure goes down when excess fluid and salt are removed from your blood by your dialysis treatment.

Potassium is a mineral that is important for a healthy heart. High or low levels of potassium in your blood may be harmful for your heart.

Target weight (or **dry weight**) is how much you should weigh after dialysis removes excess fluid from your body.

Blood pressure should be taken on a daily basis. Your blood pressure decreases when excess fluid and salt are filtered out of your blood by your dialysis treatment.

Where can you get more information?

If you have questions, speak with your healthcare team. They know you and can answer questions about you.

If you want to learn more about kidney disease:

- Call the NKF Cares Patient Help Line toll free at **855.NKF.CARES** (855.653.2273).
- Visit the National Kidney Foundation website at **kidney.org/store**.

Becoming an educated patient is very important to being healthy!

Setting a standard for care

The National Kidney Foundation, through its *Kidney Disease Outcomes Quality Initiative* (KDOQI®), defines stages of kidney disease and offers guidelines that help your doctor and healthcare team make important decisions about your medical treatment.

The information in this booklet is based on those recommended guidelines.

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The National Kidney Foundation is revolutionizing the fight to save lives by eliminating preventable kidney disease, accelerating innovation for the dignity of the patient experience, and dismantling structural inequities in kidney care, dialysis, and transplantation.

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