

# KIDNEYMATTERS

Information from the National Kidney Federation - supporting kidney patients, their friends & family

## WHAT IS PERITONEAL DIALYSIS

**What is the Peritoneum?**

**How does PD work?**

**How is PD (or a PD exchange) done?**

**Will I need to have an operation?**

**How long does it take to learn to do PD?**

**How will I get the PD fluid and supplies I need?**



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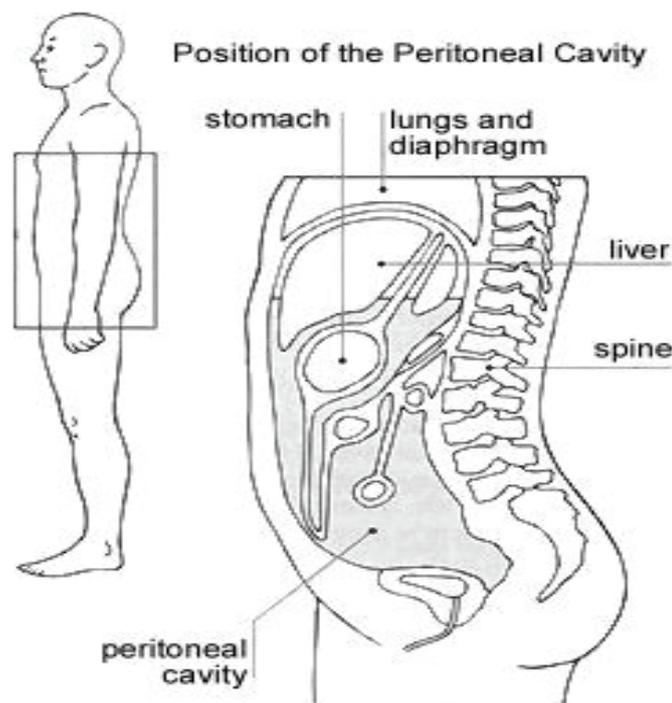
## What is the peritoneum?

The peritoneum is a natural lining or membrane that lines the inside of the abdominal wall and covers all the abdominal organs (the stomach, bowels, liver, etc.). It resembles a sausage skin, but has lots of extremely tiny holes in it. These holes allow the peritoneum to be used for dialysis (clearing waste from the blood). As blood flows through the blood vessels in the peritoneum, it flows past the holes. Although the holes are extremely tiny, water and toxins can easily pass through, but blood cells are too large. In this way the peritoneum in PD works as a 'natural filter', performing the same function as the 'artificial filter' used in haemodialysis.

The peritoneum has two layers, and the space or cavity between the layers can be used as a reservoir for dialysis fluid. Normally, the peritoneal cavity contains only about 100 ml of liquid. In fact, it can expand to hold up to 5 litres of liquid (women who have been pregnant can vouch for this).

## How does PD work?

The basic principles of dialysis are the same for PD and haemodialysis. Both types of dialysis use a special liquid (called the dialysis fluid, dialysis solution or dialysate) and a membrane (called the dialysis membrane) to do some of the work of the kidneys. In PD, the dialysis membrane is the person's own peritoneum (see diagram below). The dialysis fluid provides the 'container' in which waste products and excess water can be removed from the body. The dialysis membrane acts as a filter. It keeps the dialysis fluid and the blood separate from each other, but it allows certain substances and water to pass through it. During dialysis, waste toxins and excess water pass from the blood into the dialysis fluid, and this is drained out of the body after a few hours. A new bag of dialysis fluid is drained in, and the process is repeated.

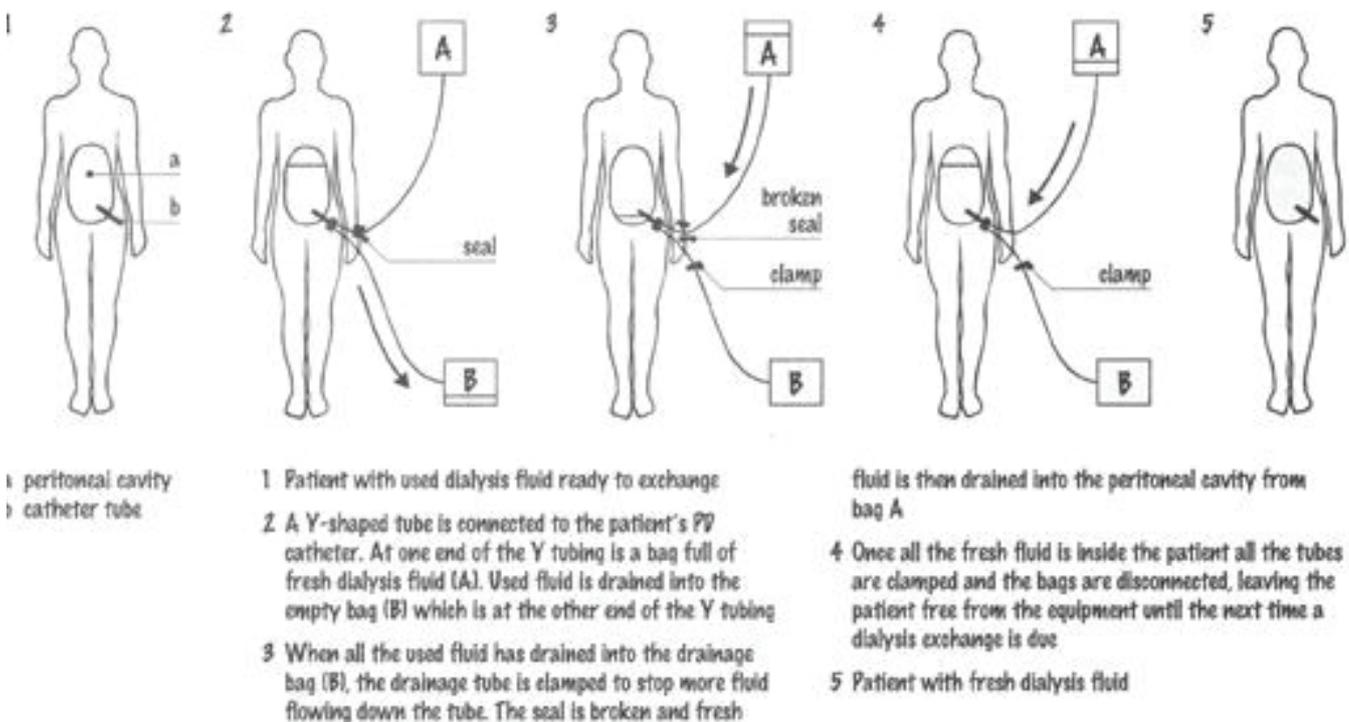


## How is PD (or a PD exchange) done?

PD needs to be done every day. PD involves draining dialysis fluid out of, and into the body (known as an exchange), and leaving dialysis fluid in the body while dialysis takes place. Draining fluid out usually takes around 20 minutes and draining fluid in takes around 5-10 minutes.

- The 'used' dialysis fluid, containing the water and waste (toxins) that the kidneys would normally have passed into the urine, is drained out of the body.
- The person then needs to drain between 1.5 and 3 litres of 'new' dialysis fluid into their abdomen. The amount will vary according to the individual's size and needs. Stages 1-2 take around 20 to 30 minutes.
- The dialysis fluid is then left inside the peritoneum to allow dialysis to take place. The length of time it is left there varies (between 1 and 8 hours), depending on individual requirements and the type of PD.

There are no 'set' times to carry out the exchanges. However, on CAPD, a four-bag regime 'fits' into a typical day. For example, the first bag might be exchanged before breakfast, the second before lunch, the third before the evening meal, and the fourth before going to bed (leaving the fluid for the last exchange in through the night). It is easy for people to adapt the timing of exchanges to their own needs. For example, if a person wants to go out for the day, they could delay the mid-day exchange, and do two 'quick bags' (say, 3 hours apart) after they come home. See diagram below.



## Will I need to have an operation?

Will I need an Operation?

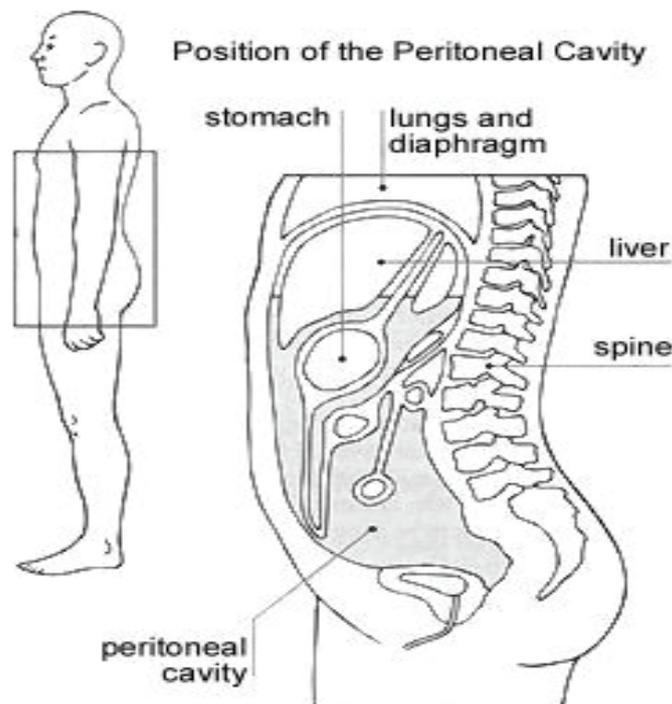
To receive PD, a kidney patient first needs to have an operation. During the operation (which is performed using a local or a general anaesthetic), a plastic tube is permanently inserted into the abdomen. This tube is called a PD catheter. It is about 30 cm (12 in) long and as wide as a pencil.

## What is a Peritoneal Dialysis (PD) catheter?

In order to carry out PD it is necessary to have a plastic tube known as a PD catheter inserted into the abdomen (tummy). The PD tube or catheter is about 30cm (12in) long and as wide as a pencil. The most commonly used type of PD catheter is called a "Tenckhoff" (pronounced Ten coff). Around half of the catheter lies inside the abdomen, and half lies outside the body. The site where the catheter enters and leaves the skin is called the 'exit site' and this is kept covered with a small dressing. An operation is needed to inset the catheter. The tube that is used to drain urine from the bladder is also called a catheter, but the PD catheter is different (people on PD do not need a urine catheter).

## Where is the PD catheter placed?

The catheter is placed in a space in the tummy known as the peritoneal cavity. The peritoneal cavity usually contains around 100 mls of liquid, but can hold up to 5 litres of fluid. See diagram below.

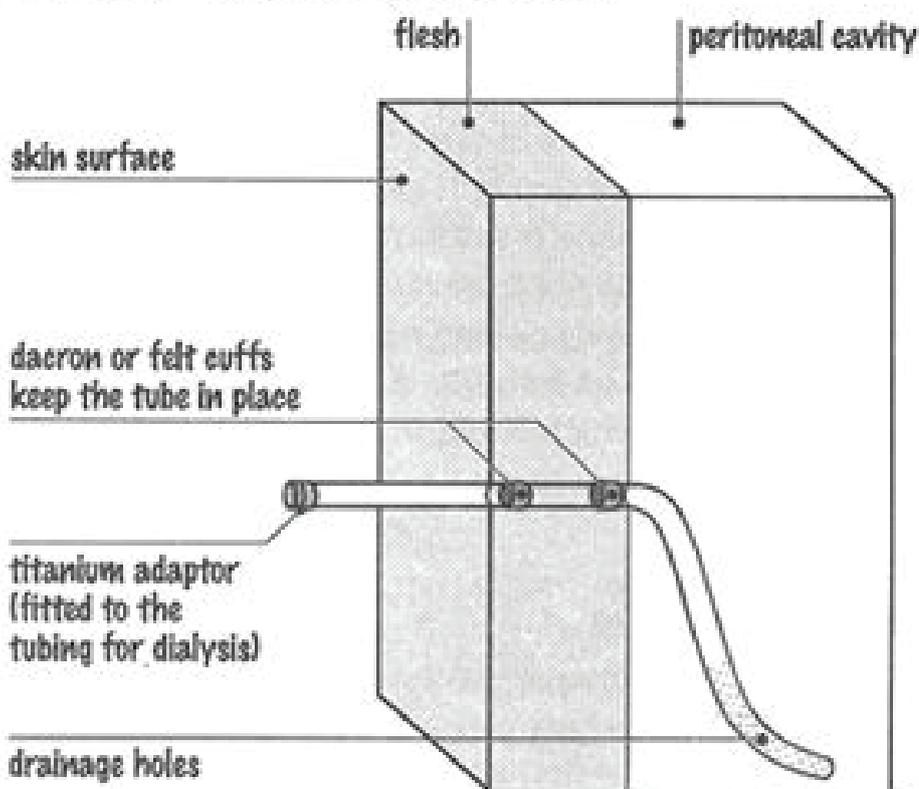


The site where the catheter exits the skin is above or below the waist/belt line. Check with the person putting in the line that the exit site is not going to be on the waistline.

### **How does the PD catheter stay in place?**

People who are new to PD often worry that their catheter will fall out, as they cannot see anything holding it in place. The site on the person's tummy where the catheter comes out is usually only a very small hole. The portion of the catheter that stays inside the abdomen has got one or two cuffs around the tube, which become anchored inside the body. The cuffs are like "hairy rings" around the tube and when flesh inside the tummy grows around them, it anchors the tube firmly in place. After a few weeks the PD catheter can't be accidentally pulled out. See diagram below.

**PD catheter - position inside the body**



Most Units advise people to cover the site where the catheter enters/exits the skin with a dressing which is provided for them. The catheter should be taped to the skin to prevent it getting pulled accidentally with clothing or when the person is asleep. Covering the exit site, and securing the catheter to the skin, may help prevent the exit site from becoming infected, and from pain if the end of the catheter is accidentally pulled.

### **How long will I be in hospital?**

The length of time that people spend in hospital will vary depending on whether the PD catheter insertion is under a local or a general anaesthetic. For a local anaesthetic (the person remains awake for the operation) the person comes into hospital and goes home on the same day. For a general anaesthetic (the person is asleep during the operation) usually the person comes into hospital on the day before, or the day of

the PD insertion, and goes home 1-2 days after the insertion. Some people stay in, and start their PD training a few days after their insertion, if their blood results show that they need to have dialysis straight away. People are generally given a date to return for PD training, often 2-6 weeks after the insertion.

### **What preparation will I need before the PD catheter insertion?**

The preparation that is needed before the PD insertion will vary somewhat depending on whether the insertion is under general or local anaesthetic, and the Unit where you are treated. For all types of insertion the person will need to have a physical examination by a doctor, and notes made on their medical history. The physical examination is to ensure the person is fit enough to have the insertion, and check for a hernia (muscle weakness of the wall of the tummy), or any other tummy problems. The person will also need to have blood tests, antibiotics (Renal Unit policies vary) and empty their bowel and bladder before the operation. Once the procedure, and potential risks, have both been explained, a doctor will ask the person to sign a form giving consent to the operation.

Before the operation, people will need to have some or all of the following tests/preparation:

Chest x-ray: This is to check the lungs are okay.

Electrocardiogram (ECG): This is a painless procedure, known as a tracing the heart, to check the heart rhythm is normal.

Blood tests: The blood count is measured as well as the blood-clotting rate.

Skin preparation: The skin on the operation site of the tummy may need to be shaved. before going to theatre. It is important to have a bath or shower on the day of the operation.

Bowel preparation: Because the operation site is close to the bowel it is important that the bowel is empty before the operation. (Most Units give medicines or an enema to help empty the bowel). Some Units put a temporary urine catheter in to empty the bladder.

Antibiotics: It is common to give a preventative antibiotic. A small plastic tube is inserted into a vein in the arm, and an antibiotic, often Vancomycin, is given.

Fasting: As with most operations, you will be asked not to eat or drink for around 4-8 hours before the operation, so that your stomach is empty.

## **What does the PD insertion procedure involve?**

A PD insertion can be done under general or local anaesthetic. This will depend on the Unit where you are treated. The procedure will be along the following lines: and your medical condition. The procedure will be along the following lines :

### **General Anaesthetic procedure:**

Just before the operation you will be asked to empty their bladder of any urine, and put on a gown. You will be asked to remove any nail polish, jewellery or dentures. You will be taken to theatre by one of the nursing staff and a porter and helped onto a trolley. The anaesthetist will put some liquid down the plastic tube which has been put in the back of the hand (known as a cannula) and this will put you to sleep. They will be given further drugs, which will ensure they don't wake up again until the operation is finished. The surgeon will make a cut about 8-10cms (3-4 inches) long down (occasionally across) the tummy. After dividing the tummy muscle, using special equipment the catheter is put in place and the part of the catheter that stays outside the skin is brought out through a small hole further down the tummy (therefore known as the 'exit site'). The operation site will be closed with stitches or staples.

### **Local anaesthetic procedure:**

The doctor doing the operation and the PD nurse assisting will be wearing gloves, gowns and masks. They will explain to you about the procedure. Sometimes you may be given some medicine to make you sleepy through a plastic tube in the back of your hand. You will be asked to empty your bladder and will wear a gown. You will be asked to lie on a couch and your tummy will be cleaned and shaved, and the area will be numbed using local anaesthetic given with a small needle. This usually stings initially but will become numb within a few minutes. . A 2-3cm cut is made below the belly button. You will be asked to lift your head up and tense your tummy muscles. A needle and special wire are inserted into the tummy, and the PD tube is passed into the peritoneal cavity. The procedure takes around 10 to 15 minutes.

### **How will I care for my Exit Site?**

You will be taught how to care for the site where the catheter comes out of the skin (known as the exit site). Usually the dressing that is on when you return from theatre is left on for several days unless it is blood stained. Most Units teach you how to wash their hands, remove the old dressing and put a new dressing in its place. The site is not handled or cleaned, and any dried crusts of blood are left to come off with the dressing. It is advised to avoid getting the exit site wet until it is healed, and information is given so you can recognise if the exit site is infected.

### **Will I have a lot of pain?**

After the operation is finished the surgeon often puts some local anaesthetic into the wound, and this should stop the person from feeling sore for several hours. As with many operations some people are more troubled than others by pain. People should expect some pain, and know that they will be given painkillers if needed, for as long as they need them.

### **Will I have a big wound?**

The cut or incision for a PD insertion is usually about 8-10cms (4inches) or smaller if it is an insertion under local anaesthetic. A downward cut is usually made below the belly button, but it can be across the tummy. The wound is stitched or stapled. The stitches (sometimes dissolvable ones are used) or staples are usually taken out after 10 days. If the person's skin normally heals quite well, they will only have a faint line where the incision took place when the skin heals. The site where the catheter leaves the body is a small hole and this should heal fully after a couple of months.

### **What happens after the operation?**

After the operation the persons' blood pressure and pulse will be checked, and the wound site examined at regular intervals to ensure that there is no undue bleeding from the operation site. The PD nurse will flush small volumes of fluid through the catheter until the fluid that comes out is clear (Some Units do this, others do not flush the catheter). The fluid is a reddish pink colour to begin with because some blood is mixed with the fluid. On the day after the operation the person or their carer will be shown how to care for the exit site.

Most people will go home one or two days after the operation. Before going home, arrangements will be made to have the stitches to the operation site removed after tens days (by a district nurse, a nurse at the GPs, or by a PD or ward nurses). Most people will be given laxatives to take to keep their bowels regular. If a person is constipated when they return for their training the catheter will not work.

### **What are the possible complications?**

Between 1 and 2 people in 20 experience complications after catheter insertion. The most common complications of a PD insertion is an infection of the tummy called peritonitis.

The possible complications that can occur after a PD catheter insertion include:

## **Infection**

The operation site, the site where the catheter exits the tummy, or the peritoneum can sometimes become infected after the PD insertion. Antibiotics given before the operation usually prevent this from happening. If the peritoneum is infected symptoms include developing a high temperature and getting bad tummy pain. A sample of PD fluid will be taken and analysed to confirm if there is an infection, and what organism has caused it. An infection of the peritoneum is called peritonitis and it is treated with antibiotics.

## **Bowel or bladder complications**

Accidental damage to the bowel or bladder caused by the PD insertion is rare. Faeces from the bowel will flow down the catheter if the bowel has been damaged (known as perforation of the bowel), and usually is associated with tummy pain. If the bowel has been perforated, an operation may be needed to repair it. If the bladder is damaged, the person will pass large volumes of very dilute urine and get spasm-type low tummy pain. An operation would be needed to repair the bladder if it was damaged.

## **Bleeding post insertion**

The peritoneum has lots of small blood vessels, so it is normal to find some blood or clots in the PD fluid drained out after the insertion. It is also quite normal for some oozing of blood to occur at the operation site, and at the exit site. If any of the larger blood vessels in the tummy region are damaged during the operation, a lot of blood could drain out with the PD fluid, accompanied by a fall in blood pressure, and a raised pulse rate. If this happens you would need to return to theatre for the damage to be assessed and repaired.

## **Leaks**

Sometimes after the insertion fluid can leak out of the exit site, or leak down into the scrotum (in males) or vagina (in females). If this happens the catheter is not used for 2-4 weeks and the area that has leaked will usually repair itself. Swelling usually goes down after a few days, if no more fluid is drained into the peritoneum.

## **Drainage problems**

A problem which can occur after insertion is difficulty draining fluid in and out of the catheter. This can be a result of a blood clot blocking the catheter, or that the catheter was not positioned correctly or it has moved in the peritoneum. An x-ray will show where the catheter is lying. An operation may be needed to reposition the catheter. About 1 in 10 to 1 in 20 people need to have their catheter repositioned. A leak or drainage problems can happen immediately post insertion, or after a few weeks, or even years! .

## **How soon will I be able to resume activities such as work, driving, sport or sex?**

Following a PD insertion people are advised not to lift anything heavy for around 6 weeks. This is to prevent the catheter from moving, or damage to the wound or tummy. It takes around 6 weeks to heal. Therefore people who work, generally get signed off work for this period and often do their PD training before returning to work.

Gentle exercise or sexual activity can usually be resumed after 2 weeks. It is sensible for people to ask their doctor for individual advice. People should check with their doctor, or with their car insurance company regarding how soon before they can resume driving.

## **Will I be in hospital for long?**

People are usually allowed to go home 1 or 2 days after the operation to insert their PD catheter. The catheter is usually 'left alone' for 5 days or more after the operation before it is used for dialysis. This allows it to 'settle in' and gives the abdominal wound time to heal. Some people remain in hospital while they train to do their PD exchanges, but most go to the hospital each day for training.

## **How long does it take to learn to do PD?**

Before anyone is expected to carry out their own dialysis, specialist nurses will train them in all aspects of their care. Most people can become competent in the exchange technique in 3 to 14 days. Some hospitals train people as an in-patient, some as an out-patient. When people first go home and have to do the exchanges by themselves, they may find it a bit daunting. However, within a few weeks most people find that they are doing the dialysis by themselves without any problems. All Units can give advice 24 hours a day, and people on PD need to know who to contact at their Unit if they have a problem.

## **How will I get the PD fluid and supplies I will need?**

PD is performed by people in their own homes. They therefore need to have supplies of fluid delivered to them and to be able to store these supplies in a convenient place. The bags of dialysis fluid come in boxes. Each box contains four or five bags of fluid. One month's supplies can be as many as forty boxes. These can be stored in a cupboard under the stairs, a spare bedroom, the shed or even the garage.

Most people receive a delivery of supplies once a month, though people with very small houses or flats may be able to arrange fortnightly deliveries. The people who deliver the supplies deliver to many others on dialysis, and are specially recruited and trained to go into peoples' homes. They will move the supplies to exactly where people want them, and will even move boxes around so that fluid from previous deliveries gets used before the new stock. Many people don't like the idea of a 'delivery man' coming to their home regularly, but may find the relationship with their driver is positive, and part of the overall security you need when doing your own dialysis.

*The National Kidney Federation cannot accept responsibility for information provided. The above is for guidance only. Patients are advised to seek further information from their own doctor.*

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