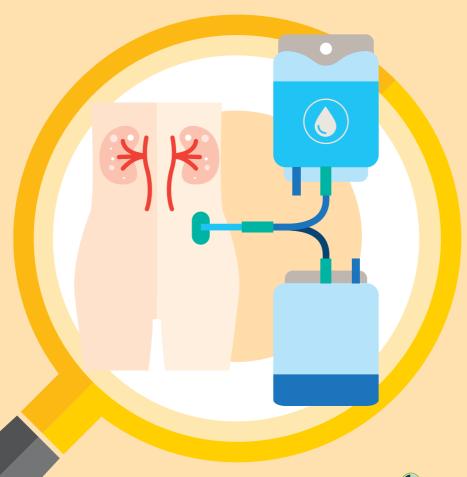
PERITONEAL DIALYSIS TRAINING



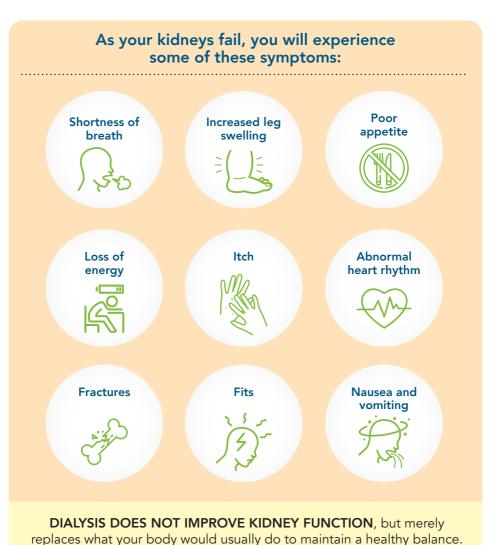


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Introduction

Your kidneys remove waste products and excess water that your body produces 24 hours a day, 7 days a week. When you develop chronic kidney disease, it means that your kidneys can no longer do this.



1

Peritoneal Dialysis (PD)

This is a form of dialysis which is performed daily by yourself (or your caregiver) in the comforts of your own home. Prior to starting Peritoneal Dialysis (PD) you will undergo a minor operation where a PD catheter (tube) will be inserted into your abdomen.

When performing PD, a cleansing fluid (dialysis fluid) will be introduced via the catheter into your peritoneal cavity. The lining of the peritoneal cavity, i.e. the peritoneal membrane acts as a filter to remove your body's waste products and excess water.

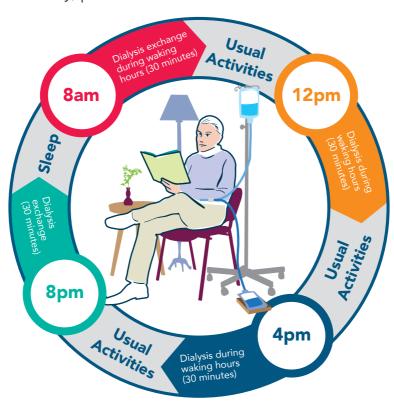
Similar to a tea bag, waste products in the body moves through the peritoneal membrane to mix with the dialysate (see diagram on the right). After a period of time, the dialysate is removed from your abdomen via the same catheter and discarded.



There are 2 forms of Peritoneal Dialysis:

Continuous Ambulatory Peritoneal Dialysis (CAPD)

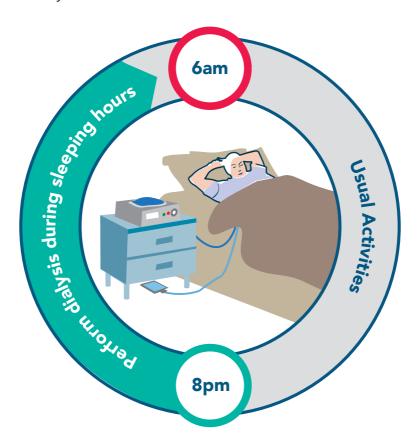
CAPD is a form of PD done manually. Each dialysis exchange is performed over 30 minutes following which, the patient can continue with daily activities until the next exchange. An exchange consists of a fill (filling the peritoneal cavity with dialysis fluid) period, dwell (dialysate is left inside the peritoneal cavity) period and finally a drain (removal of dialysate from the peritoneal cavity) period. See illustration below.





Automated Peritoneal Dialysis (APD)

This form of PD is typically performed at night using a PD machine whilst you are sleeping. The PD machine performs the fill, dwell and drain period of each cycle so that you can continue sleeping. You will usually connect yourself to the PD machine just before going to sleep, and remain attached to it for 8 - 10 hours every night. You will disconnect yourself from the PD machine in the morning and be able to continue with your usual daily activities.



Phases of a PD Exchange



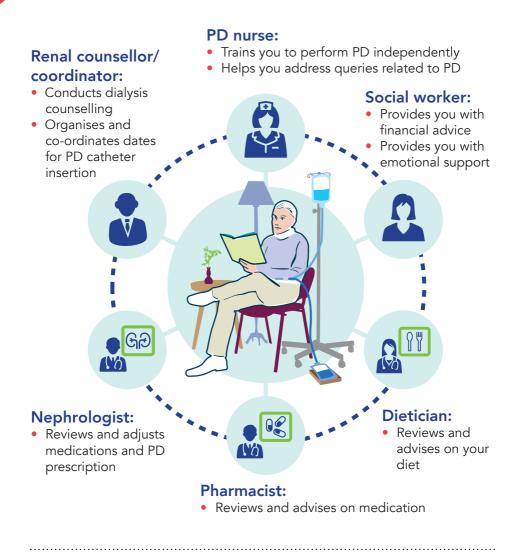






PD Team and PD Training

Starting dialysis can be a very stressful time for both you as the patient and your family, so it is important for you to know that the PD team is available to answer all queries and provide you with support always.





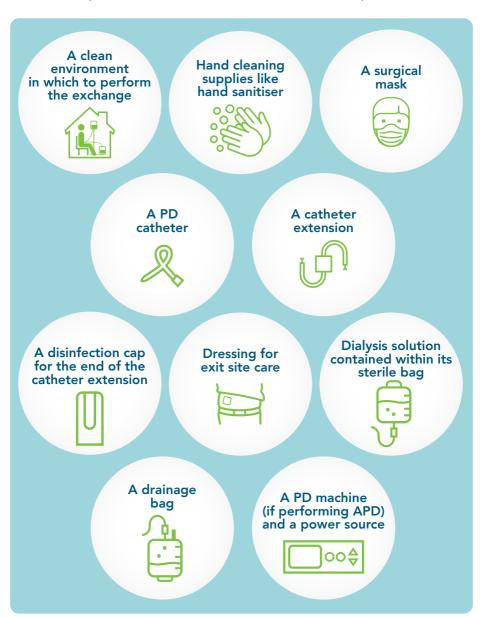
A PD nurse will teach you over 3 - 5 days how to perform PD. At the end of training, you and your caregiver will be able to:

- perform PD exchange competently
- look after your PD catheter and its exit site
- keep a treatment record of your daily PD exchanges
- recognise and manage possible complications like infection, a poorly functioning catheter, PD machine alarms and fluid overload
- understand the importance of maintaining a healthy diet and adequate nutrition
- understand the need for medications
- know how to store and order your dialysis supplies
- understand the need for certain investigations (Peritoneal Equilibration Testing and adequacy testing)

This manual has been designed as a reference guide for you and is not intended to take over the role of formal PD training.

Requirements for Performing PD

You will require the following items to be able to perform PD:



What is a PD catheter?



A soft plastic catheter will be inserted into your abdomen 2 - 4 weeks before you start PD.

Part of the catheter lies within the abdomen and exits the skin via a small hole called the exit site.

Your catheter will be attached to a catheter extension set which is changed every 6 months to reduce the risk of infection. The end of the catheter extension is covered with a new sterile cap every time it is removed.

You will be taught during PD training how to care for your catheter and exit site.

What Type of Care is Needed Immediately After Insertion of the PD Catheter?

After the PD catheter is inserted, dialysis will begin after a period of rest. PD nurses will assist you with wound care. However, there are some points you should take note of as early **post-operative** care is vital to establish and maintain the function of the catheter.

- As the surgical wound is still new, it is important to keep the exit site and surgical wound dry for at least 14 days. You should avoid bathing for 2 weeks after the surgery to prevent the wound from becoming wet. It is best to clean your body by wiping it dry during this period. You should inform your PD nurses early if the dressing becomes wet.
- The catheter should be immobilised to reduce irritation of the exit site. Avoid pulling, tugging or twisting of the catheter.
- Ensure that the exit site of the catheter is not rubbing against your belt line.
- Ensure daily bowel movement to prevent catheter migration.
- Avoid strenuous exercise within the first 2 weeks after catheter insertion.





What is the Long-term Care Required for the Catheter and Exit Site?

After your surgical wound has healed, it is important to maintain care of your PD catheter and the exit site.

Below are some important points to take note of:

Maintain good general hygiene.

Daily bathing and cleaning of the exit site with water and soap and changing into clean outer garments and undergarments is important. After bathing, the exit site should be dried before any dressing or antibiotic cream is placed over the exit site.





Keep the dressing clean and dry.

If your dressing becomes wet, ensure you clean and dry the exit site as soon as possible and apply a new dressing after.

Immobilise the catheter as close as possible to the exit site to prevent any pulling and tugging of the catheter.





Place the catheter exit site away from the belt line to prevent rubbing against the exit site.

Ensure daily bowel movement to prevent catheter migration.



Avoid the use of chemical substances such as alcohol and chlorinated substances to clean the exit site.





Avoid using any ointments, talcum powder or cream apart from your prescribed antibiotic cream near the exit site.

It is best to avoid swimming as it may also increase the risk of infection.



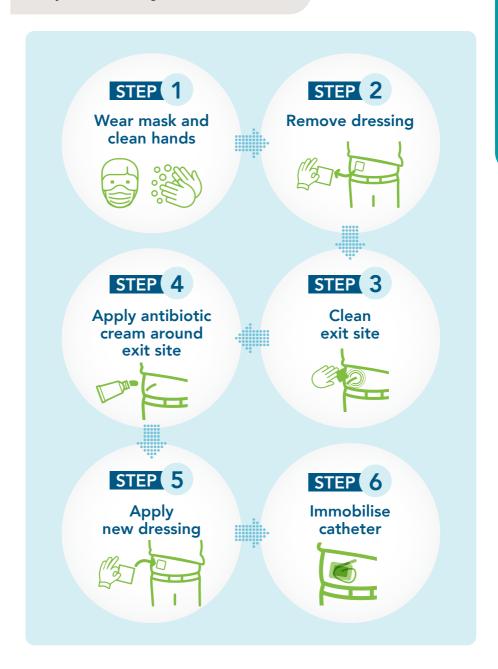


Do not take a tub bath as it may increase the risk of infection.

Do not use scissors near the catheter to prevent accidental cuts.



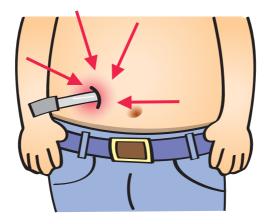
Steps for Daily Exit Site Care



How Will I Know Whether My Catheter is Functioning Well?

A functioning catheter should allow good flow of dialysate in and out of the peritoneal cavity. Usually, it takes 10 minutes for 2 litres of dialysis fluid to completely fill the peritoneal cavity and up to 20 minutes to drain. Prolonged in-flow or out-flow may suggest catheter dysfunction. If you are doing APD, catheter dysfunction may present with alarms during the dialysis. If any of this happens, please contact your PD nurse.

How Will I Know Whether My Exit Site is Healthy?



A healthy exit site is skin coloured with no tenderness or discharge. Please inform your PD nurse if you notice any of the following features:

- Pain
- Discharge
- Crusting

- Swelling
- Redness
- Extrusion of the cuff

Performing PD at Home



During PD Exchange

Before PD Exchange

What do you need to do prior to performing a PD exchange?

- Prepare environment
- Prepare self
- Prepare dialysis equipment and supplies

Where should you perform your PD exchanges?

A clean well-lit room with no distractions.

How often should I perform the exchanges?

This will depend on the dialysis prescription provided by your doctor but you will usually require 3 - 4 manual exchanges, or a single connection to the PD machine for 8 - 10 hours a night.



How do I discard the drained fluid and the used equipment?

Drained dialysate is discarded into the toilet bowl and used equipment should not be reused. Before a PD exchange is performed, remember to prepare the environment, yourself and the dialysis equipment and supplies.



Environment where you will be performing your PD exchange



Yourself/ Your Caregiver



Dialysis equipment and supplies

Prepare Environment

Choosing the area to perform your PD exchange is the first step to maintaining good hygiene. The chosen area should be:



Clean and not cluttered or dusty.



Draft free. Choose a room where the windows can be closed, and where fans and air-conditioning can be switched off to prevent drafts leading to contamination during the PD exchange.



Well lit.



Free of distractions. Choose a room where you can have privacy. Children should be kept out to minimise distractions when performing PD exchange.



Free of pets. All pets to be kept away from the room during the PD exchange.

The PD dialysis fluid should be placed on a clean surface that is also large enough to fit all the supplies needed.



Prepare Yourself/Your Caregiver

Daily bathing and grooming help us to maintain good hygiene and health for performing PD. As part of grooming, care should be taken to ensure that our finger nails are trimmed and clean. Nail varnish should be avoided so that we can ensure that there is no dirt trapped under our nail tips before performing PD.

It is advisable to wear a surgical mask before performing PD as this helps to reduce the risk of infection during the PD exchange.

Jewellery and watches should be removed prior to hand washing. Hands should be washed properly and disinfected using the 7-step handwashing technique during any of the following moments:





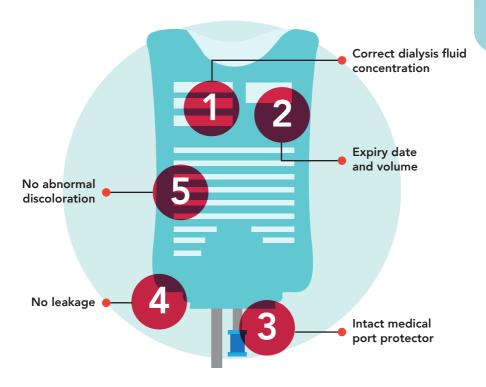
Before connection and disconnection of the PD catheter



Hand washing and disinfection is important even if the hands appear to be clean as germs are invisible to our eyes.

Prepare Dialysis Equipment and Supplies

Before performing PD, you should ensure the dialysis fluid solution is suitable by checking for the following:



If there is any suspicion that the dialysis fluid is contaminated, it should not be used. Contact your PD nurse and PD vendor as soon as possible.

For patients on APD, ensure that all supplies (sterile cap and cassette) are in a sealed packet prior to use.

Once you have opened the sealed packet, any equipment that falls onto the floor becomes contaminated and must not be used. It should then be discarded appropriately.

Your Diet and PD

Reducing Sodium Intake

Sodium is a mineral found naturally in foods, but most of the sodium in our diet comes from seasonings, e.g. salt, soy sauce and processed foods such as canned meat and instant noodles. It is recommended that you **do not exceed 3g of added salt daily** as taking excessive amount of sodium will result in additional fluid overload and poor blood pressure control.

Tips to reduce your sodium intake



Go for fresh foods whenever possible, as these are naturally low in sodium.



When cooking, **limit the use of sodium seasonings** (e.g. salt, soy sauce, oyster sauce and stock cubes) to the equivalence of 1g per meal using the spoon provided.

Example of sodium seasonings to limit:





Enhance the taste of your foods by using other **flavourful ingredients** such as herbs, spices, lemon, garlic, ginger, onion, fresh chilli and vinegar. Examples of flavourful ingredients to use:



If you have to choose processed foods, look out for these words on food labels, e.g. "low sodium", "sodium free", "unsalted" and "no added salt".

Please note that there may still be high levels of sodium in foods labelled as "reduced sodium".





- Using a salt substitute is another possible way to lower sodium intake as it contains less sodium compared to table salt. However, it is still advisable to limit/reduce amount used in cooking.
- When eating out, ask for foods to be prepared with less salt and sauces whenever possible. You should avoid drinking soups/broths, and using additional gravies and dipping sauces, e.g. chilli sauce and ketchup.

Restricting Fluid Intake

Restricting fluid intake helps to reduce fluid build-up and achieve better blood pressure control.

Fluids include all beverages and foods that are liquid at room temperature. These include:



Tips to reduce fluid intake:

- Use measuring cups to accurately **measure your fluid** intake.
- Fill up a jug/bottle of water and use this to keep track of your fluid intake. Whenever you consume any beverages and/or take foods that contain fluids, pour out an equal amount from this same jug/bottle.
- Spread out your fluid allowance throughout the day.
- Drink from smaller cups.
- Rinse your mouth with water but do not swallow.
- Suck on an ice cube slowly as it is better at quenching thirst. Ice should be included in your daily fluid intake as it is a liquid at room temperature.
- Suck on sweets or lemon slices to stimulate saliva production.
- Limit sodium intake. Excessive sodium intake makes you thirsty, making it difficult to keep to your fluid allowance.

Controlling Phosphate Intake

When your kidneys are not working properly, phosphate may build up in your blood. High blood phosphate levels can draw calcium out of your bones, making them weak and brittle. This can also result in calcium deposition in your blood vessels, lungs, eyes and heart.

If your blood phosphate levels are high, it is important to limit intake of high phosphate foods and choose lower phosphate alternatives. If you have been prescribed phosphate binders, it is important to remember to take your phosphate binders together with your meals as they help to reduce the amount of phosphate that your body absorbs from the foods taken.

The table below shows examples of high phosphate foods and where they can be found in.

High phosphate foods	Found in	Ways to reduce phosphate intake
Additives in processed foods	Processed meat e.g. sausage, ham and luncheon meat Fish paste (fishball, fishcake)	Choose fresh foods over processed foods

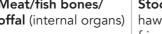
High phosphate foods	Found in	Ways to reduce phosphate intake
Dried shrimps (hei bee)	Laksa Mee rebus Mee Siam Rojak	When eating out: Choose cut chilli instead Reduce frequency of these hawker foods; leave out gravies if you must have these dishes When cooking at home: Prepare your own sambal instead of using commercial ones and omit dried shrimps and/or shrimp paste Flavour dishes with herbs, spices, garlic, ginger, onion and fresh chilli
Anchovies (ikan bilis) including stock/broth made from them	Nasi lemak	 When eating out: Reduce frequency of these hawker foods Choose soup noodles but do not drink the soup

High phosphate foods

Found in

Ways to reduce phosphate intake

Meat/fish bones/ offal (internal organs)



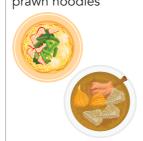


When cooking at home:

• Flavour soup with vegetables e.g. potato, carrot, corn and onion



Soups of hawker foods e.g. wanton mee, minced meat noodles, fishball noodles, yong tau fu, prawn noodles



Cola-based soft drinks

Cocoa/malt-based beverages

Creamer-based beverages

Condensed/ evaporated milk



Coca Cola, Pepsi, Sarsi, Root beer, Hot chocolate, Milo, Ovatine and Horlicks 3-in-1 and 2-in-1 coffee/tea, Kopi, Kopi-C, Teh, Teh-C



Non cola-based soft drinks, plain coffee/tea

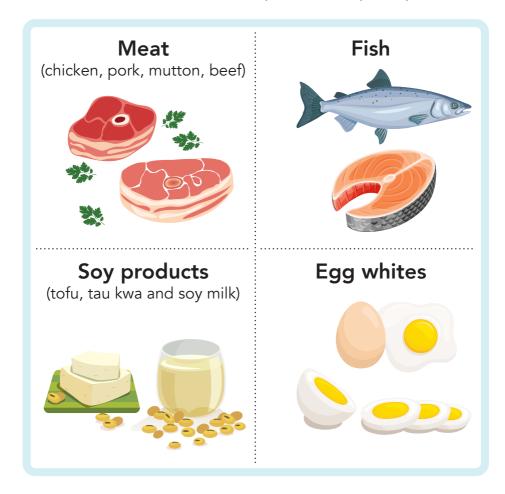


High phosphate foods Ways to reduce Found in phosphate intake Coconut Nasi Lemak When eating out: (cream/milk/flesh) • Choose plain rice instead containing products of flavoured rice Laksa • Reduce frequency of these hawker foods: leave out gravies if you must Curry/Rendang/ have these dishes Longtong When cooking at home: Make curry without coconut cream/milk e.g. Indian style curry; or reduce the amount used Kuehs

Increasing Protein Intake

It is important to have enough protein to build and repair tissues in the body. Protein can be lost during dialysis. Therefore, a higher protein intake is required after you start dialysis.

The diagram below shows examples of high quality protein.



Infections

The peritoneal cavity is usually sterile and free of germs. It is important to maintain this to reduce the possibility of an infection. To prevent infections, everything that comes into contact with the peritoneal cavity must be clean.

This includes the following:

- The work surface where you place the sterile dialysate bags
- The entry ports of the bags
- The catheter extension
- All medications and needles used to add medications to the dialysate bags
- The dialysis fluid and its bag
- The internal parts of the equipment
- **▼** The sterile cap

The 3 main infections are:

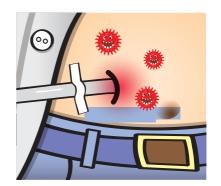
- Exit site infection
- Tunnel tract infection
- Peritonitis

Exit Site and Tunnel Tract Infection

An exit site infection is a complication that occurs when germs infect the skin around the catheter.

A tunnel tract infection is an infection of the tunnel under the skin where the catheter lies.

These may occur due to improper care of your exit site.



You will know that you have an exit site or tunnel tract infection if you develop:

- Pain around the exit site or on applying any pressure on the catheter
- Redness around the exit site
- Swelling around the exit site or of the tunnel
- Discharge of pus or bloody fluid from the exit site

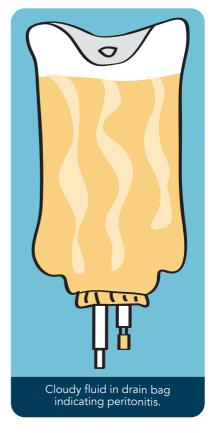
If you develop any of the above, please inform your PD nurse IMMEDIATELY.



Peritonitis

This is a serious complication of PD and occurs when germs enter the peritoneal cavity and may be fatal. It is curable, but requires immediate medical attention. The germs can enter the peritoneal cavity due to:

- Improper practices when performing the PD exchange (inadequate hand washing or accidentally contaminating something that was supposed to be sterile)
- Infection of the exit site
- Improper use of the face mask
- Any break or leak in the PD system



You will know that you have developed peritonitis if any of the following occurs:



Cloudy drained PD fluid



Abdominal pain, vomiting or diarrhea



Fever

If you notice any of these symptoms, please inform your PD nurse **IMMEDIATELY**. **DO NOT WAIT** to see if the cloudy PD fluid improves.

Bring a sample of your cloudy PD fluid to the PD unit for the nurses to perform the necessary investigations.

How can You Prevent Exit Site Infections and Peritonitis?

It is important to maintain good hygiene practices as detailed in the earlier sections to reduce the possibility of developing an infection.

Management of Problems Encountered During PD

Problem	Possible causes	What should you do?
High blood pressure (greater than 150/90)	 Fluid overload Non-compliance to blood pressure medications High salt intake 	 Reduce salt and water intake Ensure you are taking all your prescribed blood pressure medications Continue your usual PD but inform your PD nurse
Low blood pressure (lower than 100/70)	Dehydration Excessive blood pressure medications	 Stop blood pressure medications Hold off PD and inform your PD nurse immediately
Swelling of ankles	1. Fluid overload	 Reduce salt and water intake Ensure you are taking all your prescribed diuretics Your dialysis prescription may need to be adjusted so remember to inform your PD doctor at your next appointment
Feeling breathless whilst resting or on exertion	1. Fluid overload	 Reduce salt and water intake Ensure you are taking all your prescribed diuretics Inform your PD nurse immediately
Touch contamination during connection	Accidental contamination of PD equipment and supplies that should be sterile	Do not perform the PD exchange. Clamp your catheter extension, cap your catheter with a new sterile cap and inform your PD nurse immediately

Problem	Possible causes	What should you do?
Prolonged Inflow The dialysis fluid is not flowing into your abdomen during the 'fill' phase of the exchange or the in flow time is constantly prolonged (longer than 10 minutes)	1. There may be kinks in the tubing 2. You may have left the clamps closed or the patient extension is still closed 3. Clots forming in the catheter	 Ensure tubing is straight and not kinked Ensure all clamps and patient extension are open Inform your PD nurse immediately if you are still not able to fill your dialysis fluid
Prolonged Drain The fluid is not draining out of your abdomen during the 'drain' phase of the exchange or the out flow time is constantly prolonged (longer than 20 minutes)	1. The twist clamp of your catheter extension is closed 2. The catheter or catheter extension is twisted or folded over 3. There is fibrin present in the drainage 4. Constipation 5. Your peritoneal catheter may have migrated	 Ensure the twist clamp of your catheter is opened Ensure the catheter is not twisted or folded If you notice 'white' floating material in your drainage and drainage problems persist, inform your PD unit Take your laxatives regularly and ensure you open your bowels daily Frequently change the position you are in (moving from left to right, sitting up or lying down) during the drain phase and inform your PD nurse Should the problem persist, inform your PD nurse
Fluid dripping out of the bag during the PD exchange	1. There may be a break in the dialysate bag	Immediately close the catheter extension, attach a new sterile cap to the extension and replace the defective dialysate bag with a new dialysate bag

Problem	Possible causes	What should you do?
Fluid dripping from around the catheter during the PD exchange	1. The catheter extension may be damaged	Immediately close the catheter extension, attach a new sterile cap to the extension and inform your PD nurse
Red drained fluid	May be due to blood from menstruation May be due to infection	Inform PD nurse
Dark yellow but not cloudy drained fluid	Due to fluid remaining in peritoneal cavity for prolonged period of time e.g. overnight	Continue usual PD exchanges but inform PD nurse if persistent
Cloudy drained fluid	1. May be due to infection	Immediately inform PD nurse. Bring the cloudy drained fluid to your PD nurse
Pain around the exit site	You may have accidentally pulled on your PD catheter	Inform your PD nurse immediately if you also notice any bleeding, redness, swelling or fluid coming from the exit site
Fluid coming out of exit site	1. The exit site may not have healed completely after your insertion 2. You may have developed an infection of your exit site	Cover the exit site with sterile gauze and inform your PD nurse immediately

Problem	Possible causes	What should you do?
Swelling around exit site	You may have developed an infection of your exit site You may have accidentally pulled on your PD catheter	Inform your PD nurse immediately
Stomach pain	1. The site where the catheter was inserted has not healed yet 2. May occur at the end of each drain phase 3. May be due to peritonitis	 Inform your PD nurse immediately if you also notice fluid coming out of the exit site Inform your PD nurse if persistent Inform your PD nurse immediately if your drained fluid is also cloudy
Fever	May be due to peritonitis May be due to an exit site infection May be due to an infection not related to your PD	 Inform your PD nurse immediately if your drained fluid is also cloudy Seek medical attention
Diarrhea and vomiting	1. May be due to peritonitis	Inform your PD nurse immediately if your drained fluid is cloudy

Frequently Asked Questions



Why is it important to perform daily dialysis?

As your kidneys fail, PD enables the daily removal of toxins and extra fluid that would usually be removed by your kidneys. Performing dialysis daily prevents these toxins and extra fluid from accumulating. It is important to remember that every patient's condition is different and so there may be differences between yours and another dialysis patient's dialysis orders. Your medical team will ensure that the most suitable dialysis prescription is made for you.

With adequate dialysis, you will notice less swelling, and an improved sense of well-being with higher levels of energy and enhanced appetite.



What happens if I miss a session of peritoneal dialysis?

If you miss your PD exchanges, there will be inadequate removal of toxins and fluids and you may start to experience the same symptoms you had prior to starting dialysis. These include: nausea, loss of appetite, generalised weakness, ankle and leg swelling, vomiting, feeling of tiredness, persistent itch and breathlessness.

Occasionally the above symptoms may occur despite you performing all your prescribed PD exchanges. This usually suggests that you require a change in your dialysis prescription and this will be addressed by your kidney doctor.

Q3 Can I continue to work while on peritoneal dialysis?

Yes. After starting dialysis, you will feel well enough to return to work. Depending on the nature of your work and your working hours, your doctor will be able to tailor a dialysis prescription to fit your work schedule.



Can I continue with my favourite sports?

Regular exercise has many benefits for PD patients and you should continue exercising. Patients can perform most exercises except for swimming. You must just remember to clean and dry your exit site after completing each exercise activity.

As you may have other medical conditions, it is advisable to start slowly and gradually increase your levels of exercise activity. You should also consult your doctor, nurse or physiotherapist before embarking on a new exercise regime.



Will I still be able to enjoy evenings out with family and friends?

PD allows you to live life to the fullest as possible. For patients on APD, your dialysis can be started later on in the evening and after you have returned home from your planned evening activities. This will however mean that your dialysis will end later the following morning. For patients on CAPD, you can plan to fill in your overnight dialysis fluid either before you go out for the evening or upon returning from your evening out.

Please remember to discuss any possible adjustments you may plan to make to your PD prescription with your PD team.



Q6 How will my sexuality be impacted?

Various reasons such as anaemia or hormonal disturbances may cause both men and women affected by kidney failure to experience difficulty with sexual activities. After starting dialysis, there may be an improvement in these difficulties but due to other factors such as stress, anxiety or altered body image, patients may still find it difficult to continue with sexual activities.

Please highlight any issues you may be having with your medical team or social workers so that appropriate interventions can be made.



Q7 Will I be able to continue to travel overseas?

Yes, you will still be able to see the world whilst on PD. Patients usually performing APD will be taught how to perform CAPD when travelling. It is important to inform your primary doctors or nurses in advance so that they can advise you on the PD regime you will be performing while overseas.

You may be able to obtain PD dialysis fluids in the country you are travelling to, or if this is not available, you may travel with your PD supplies on your flight, bus, car or cruise.

It would be advisable to purchase health and travel insurance prior to your travels, stating clearly that your have end stage kidney failure and that you are on PD.

Please remember to seek early medical attention if you become unwell.



Where can I find additional information on the steps of performing PD?

For usage of Baxter machines, please refer to https://youtu.be/AqJqzrV30pQ https://youtu.be/G_wIKCupCKY

For usage of Fresenius machines, please refer to https://www.youtube.com/user/FreseniusSingapore

Notes:

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