

Peritoneal Dialysis - An Overview

Deepak K Nair

Assistant Professor, MOSC College of Nursing, Kolenchery, Kerala, India

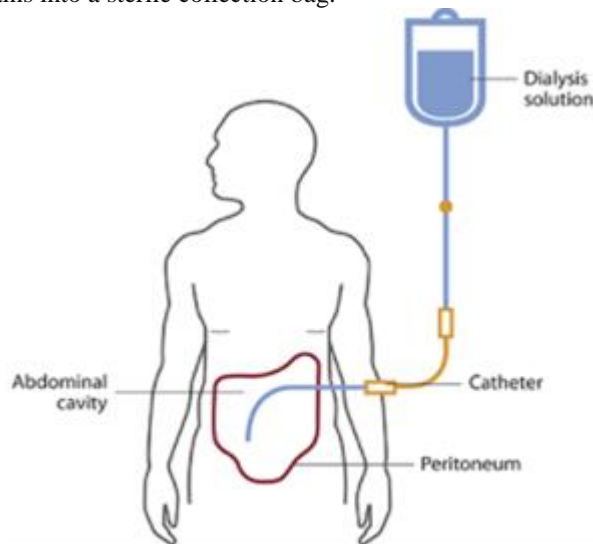
Abstract: This article is an overview of peritoneal dialysis. The following aspects are included in the article such as introduction on peritoneal dialysis ,types of peritoneal dialysis such as Continuous ambulatory peritoneal dialysis and automated peritoneal dialysis , principles ,procedure for doing the peritoneal dialysis ,complications and guidelines during COVID-19.

Keywords: Peritoneal dialysis, Continuous ambulatory peritoneal dialysis, Automated peritoneal dialysis

1. Introduction

Peritoneal dialysis (PD) is a type of dialysis which uses the peritoneum as the membrane through which fluid and dissolved substances are exchanged with the blood. The main purpose of peritoneal dialysis is to remove excess fluid, correct electrolyte problems, and remove toxins in those with kidney failure. Peritoneal dialysis has better outcomes than hemodialysis during the first couple of years. Peritoneal dialysis was first carried out in the 1920s; however, long term use did not come into medical practice until the 1960s.

During peritoneal dialysis, dialysate flows into the abdomen and stays there for a prescribed period of time, dextrose in the dialysate helps filter waste, chemicals and extra fluid in your blood from tiny blood vessels in the lining of your abdominal cavity and when the dwell time is over, the solution along with waste products drawn from your blood drains into a sterile collection bag.



Peritoneal dialysis

(Source: <https://www.niddk.nih.gov/health-information>)

Types of peritoneal dialysis

- 1) Continuous ambulatory peritoneal dialysis (CAPD)
- 2) Automated peritoneal dialysis

The main differences between the two types of peritoneal dialysis are the schedule of exchanges and one uses a machine and the other is done by hand.

CAPD (Continuous Ambulatory Peritoneal Dialysis)

CAPD, (Continuous Ambulatory Peritoneal Dialysis), is a way of artificially removing the waste fluid and toxins from the body by using the abdominal membrane as a filter. The treatment involves putting special dialysis fluid into peritoneal cavity, usually four times per day every day. It is a painless procedure that could be done at home, car, and workplace. Each treatment takes about 30 minutes.

CAPD works continuously (24 hours a day) removing the waste products and fluid from your body. It uses the lining of peritoneal cavity, called the peritoneum and acts rather like a sieve and allows the toxins to pass out. The fluid contains glucose, which filters poisons from the blood into the fluid. The fluid is then drained out with the poisons. The scientific description for this process is osmosis and diffusion.

A surgical procedure is performed to insert a soft tube called a Tenckhoff catheter into the abdomen through. Through this catheter, a dialysis solution is inserted. The dialysis is performed by attaching tubing to the catheter, which has two bags – a full bag of dialysis fluid, and an empty bag to drain into. Drain out the old dialysis fluid with all the toxins in it and then refill the new solution straight afterwards. The dialysis solution stays in the abdomen for approximately 4–6 hours during the day and 8–10 hours overnight. The removed fluid look like clear, diluted urine. This fluid is sterile and odorless.

APD (Automated Peritoneal Dialysis)

Automated peritoneal dialysis (APD) is similar to CAPD, except a machine is used to control the exchange of fluid while you sleep. A small machine, the size of a suitcase, is programmed to do the dialysis overnight while asleep, which frees the day for you. Attaching a bag filled with dialysate fluid to the APD machine before going to bed. The machine automatically performs a number of fluid exchanges. Usually 8 to 10 hours, patients need to be attached to the APD machine. At the end of the treatment session, some dialysate fluid will be left in your abdomen and it will be drained during the next session.

Complications of peritoneal dialysis

- Infections: An infection of the abdominal lining (peritonitis) is a common complication of peritoneal dialysis. An infection can also develop at the site where the catheter is inserted to carry the cleansing fluid (dialysate) into and out of your abdomen.

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- Weight gain: The dialysate contains sugar (dextrose). Absorbing some of the dialysate might cause you to take in hundreds of extra calories daily, leading to weight gain. The extra calories can also cause high blood sugar, especially if you have diabetes.
- Hernia: Holding fluid in your abdomen for long periods may strain your muscles.
- Inadequate dialysis: Peritoneal dialysis can become ineffective after several years. One might need to switch to hemodialysis.

Recommended tests to check the effectiveness of dialysis

- Peritoneal equilibration test (PET). This test compares samples of your blood and your dialysis solution during an exchange. The results indicate whether waste toxins pass quickly or slowly from your blood into the dialysate. That information helps determine whether the dialysis would be improved if the solution stayed in the abdomen for a shorter or longer time.
- Clearance test. A blood sample and a sample of used dialysis solution are analyzed to determine how much of a certain waste product (urea) is being removed from the blood during dialysis.

If the test results show that your dialysis schedule is not removing enough wastes, the doctor might change dialysis routine to:

- Increase the number of exchanges
- Increase the amount of dialysate you use for each exchange
- Use a dialysate with a higher concentration of dextrose

Guidelines during COVID19

1) Patients already on CAPD

Patients who are already in peritoneal dialysis (PD) treatment have the relative advantage over patients who are receiving hospital or satellite - based haemodialysis treatment as they will not be exposed to hospital environment. This will reduce their exposure to infection. However, they should arrange their delivery of supply well in time to avoid missing dialysis exchanges. Used dialysis bags and tubing should be properly disposed using 1% hypochlorite solution first and disposed in a sealed bag. Used dialysis fluid should be drained in the flush 6 of 7.

2) New patient planned for CAPD

It will be difficult to maintain a service that can commence new patients on PD, mainly through a lack of healthcare worker to insert PD catheter and to provide the intensive training required. Therefore, initiation of new patient should be avoided.

3) Acute PD

Use of acute peritoneal dialysis can be lifesaving and should be used as and when required and, in the setting, where hemodialysis facility is not available. Health care worker should use all precautions while initiating acute PD and discard used consumables properly.

Personal protective equipments (PPE)

Personal protective equipment must be used while dialyzing COVID - 19 positive patients. These include, shoe covers, gown, surgical cap or hood, goggles or eye shields, mask and surgical triple layer masks and cloth masks can be used as alternatives for all other procedures. Follow correct method of donning and doffing personal protective equipment's (PPE). It is always better to give hand on training of donning and doffing to staff who is going to handle suspected or positive patients.

2. Conclusion

Severe forms of kidney disease which requires dialysis are curable in some instances. Even if it is not curable, the patient can still lead a meaningful life while on dialysis. Kidney is the only vital organ which can be replaced long term by a machine with reasonable success. Dialysis is not the end of life!

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