

Peritoneal Dialysis Fact Sheet

What Is Peritoneal Dialysis?

Peritoneal dialysis (PD) is a dialysis option for patients with chronic kidney disease (CKD). This form of dialysis is usually performed by the patient at home. PD occurs inside the body using the peritoneal membrane as a filter. This membrane covers the organs that lie within the abdominal cavity and is semipermeable, allowing certain-sized substances to pass through it.

How Peritoneal Dialysis Works

A soft silicone catheter is surgically placed through the abdominal wall. The catheter can generally be used 2 weeks after it is inserted (Todd, 2015). Sterile dialysis solution (2 to 3 liters) is instilled into the peritoneal cavity through the catheter. The volume of solution used depends upon the size of the patient. Through the process of diffusion, waste products are removed from the blood. Excess fluid is removed by the process of osmosis using a hypertonic dextrose or maltose-based solution. Both waste products and excess fluid are transported across the peritoneal membrane into the dialysis solution. The used dialysis solution is drained from the peritoneal cavity and replaced with new sterile solution (National Kidney Foundation [NKF], 2012).

Types of Peritoneal Dialysis

There are two types of PD. One is continuous ambulatory peritoneal dialysis (CAPD). The other is automated peritoneal dialysis (APD).

CAPD

This type of dialysis is typically done 7 days a week; 4 to 5 exchanges of new solution are done each day. During an exchange, which takes about 30 minutes, the solution that was inside the peritoneal cavity is drained, and new solution is instilled. Both fill and drain are done by gravity. When the fill bag is empty, it is disconnected, and a cap is placed on the catheter so the patient can move around and perform normal activities. The new solution remains in the cavity for 4 to 6 hours; this is called the dwell time. The last evening exchange dwells overnight to allow for an uninterrupted night's sleep (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2018).

APD

During APD, the exchange of dialysis solution is performed by a machine while the patient sleeps. Each exchange is referred to as a "cycle." Patients are taught how to set up the machine and generally connect to the cyclor at bedtime, 7 days a week, for 8 to 10 hours each night. The machine controls the three phases of the cycle: draining toxin saturated solution, refilling with new solution, measuring the volume, and measuring the dwell time. The machine is also equipped with an alert/alarm system, which detects certain problems during the treatment, such as slow drain. In the morning, the machine gives a report of the overnight treatment and can perform a 'final fill' of dialysate, which remains in the patient throughout the day after the disconnection (NIDDK, 2018). Newer technology allows these automated cyclor machines to upload patient data to the 'cloud,' providing the dialysis practitioner a more live-time assessment of the treatment.

Incremental PD

Incremental PD involves taking advantage of the residual renal function that is usually present at initiation of dialysis to initially prescribe lower doses of PD while still achieving individualized clearance goals. With this strategy, less than the 'standard' volume and time on PD is ordered. Clearance via the peritoneum and residual kidney function together achieve or exceed the goal early in the prescription therapy. As there is a decline in residual function, the PD prescription is adjusted to provide more peritoneal solute and fluid removal.

Advantages and Disadvantages of Peritoneal Dialysis

With CKD or modality education, the patient will consider if PD fits their lifestyle and situation.

Advantages	Disadvantages
Patient involved in self-care	Four exchanges per day
Less restricted diet	Some risks of infections
No needles	Potential weight gain
More steady blood levels	Storage space at home is needed
Preservation of kidney function	Body image changes
Less or no post dialysis recovery time	Permanent external catheter

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PD as a Dialysis Option – What the Patient Needs to Know

- Options for renal replacement therapy (in-center and home hemodialysis, PD, and transplantation) should be presented by a knowledgeable professional who can address issues and questions about each option.
- The option of PD can be presented in either an individual or group setting, and should include family members and significant others.
- A description of PD should include:
 - Introduction to the supplies (bags, tubing, and catheter) and space needed for home storage.
 - Demonstration of exchange.
 - Examples of exchange schedule and daily routines.
 - Information on the less restrictive diet required.
 - Prospective patients should be offered the opportunity to network with established patients on PD.
 - The need to have certain dexterity or an onsite evaluation using the real supplies.

PD Patients: Who Are Likely Candidates?

The success of PD depends on the patient's motivation, physical and mental capability to complete procedures, and the desire for independence. If there are any clinical or psychological contraindications, the nephrologist and PD nurse or nurse practitioner will discuss these concerns with the patient and family.

- Potential candidates can include, but are not limited to, patients who:
 - Choose PD.
 - Desire self-care and independence.
 - Are patients or caregivers who desire self-scheduling for employment, travel, or flexibility.
 - Have cardiovascular disease.
 - Have diabetes mellitus.
 - Are pediatric patients.
 - Are pre-transplant candidates.
 - Have residual kidney functions (Todd, 2015).

Home PD: What the Patient Needs to Know

Once the PD catheter insertion site has healed, individualized training by a registered nurse is required. Training sessions are hands-on demonstrations that involve actual dialysis treatment exchanges in 2- to 4-hour sessions over 2 weeks. Patients must be taught how to safely perform home dialysis therapy, keep records, and how to handle problems, such as changes in blood pressure, fever, machine problems, or catheter problems (Todd, 2015). Below is some of the content covered during training with the expectation the patient can perform/address confidently:

- Location and function of the peritoneal membrane.
- Short- and long-term complications of uremia.
- Aseptic technique in the home.
- Catheter and exit site care.
- Dialysis solution exchange procedure.
- Fluid balance guidelines.
- Addition of medication.
- Self-monitoring of vital signs (blood pressure and weight) and maintaining home dialysis records.
- Monthly clinic visits and review of current medications, procedures, and techniques.
- Individual activity and exercise regimen.
- Nutritional needs are assessed and modified by the renal dietitian.
- Social and emotional needs are assessed by the renal social worker.
- Incorporating the patient's need for relationships and sexual identity in plan of care.
- Monitoring, ordering, and inventory of supplies.
- Understanding and recognizing complications of PD:
 - Fluid overload.
 - Exit site infection.
 - Dehydration.
 - Exit site leak.
 - Fibrin formation.
 - Tunnel infection.
 - Bloody effluent.
 - Peritonitis.
 - Constipation.
 - Catheter-related pain.
 - Obstruction of flow.
 - Contamination.

Caring for the PD Patient – The Role of the PD Nurse

The role of the PD nurse provides a unique opportunity to be an autonomous, innovative, and resourceful professional.

The PD nurse functions in several capacities:

- Educator.
- Clinician.
- Care coordinator.
- Leader of the health care team.
- Patient health advocate.
- The most consistent member of the health care team who is involved with the patient on PD is the nurse. The relationship that develops is crucial for the well-being of the patient and family, and the success of PD for the patient.
- As a responsible professional, the PD nurse is pivotal in coordinating a consistent and clear plan of care for the patient.
- Using professional competency and communication skills, the PD nurse can establish a trusting relationship with the patient and the entire health care team.

References

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