

PERITONEAL DIALYSIS (PD)

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Background



<http://www.sapiensfoundation.org/peritonealdialysis.html>

Acknowledgements: Professor Arleen Sawitzke, V.A. Hosp. and U of U Hosp.

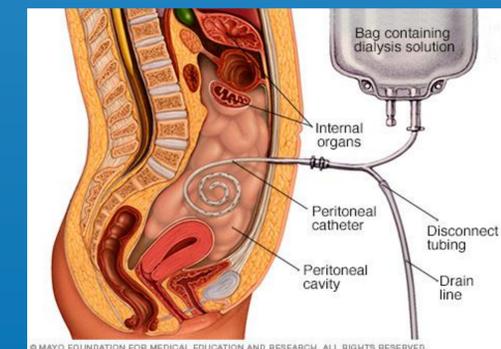
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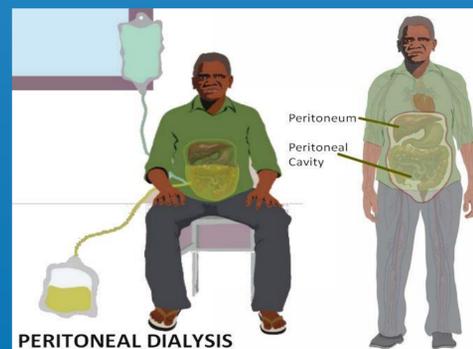
Limitations of PD:

Medications while on PD:

1. **Erythropoietin** – Without functional kidneys, a person may become anemic (low red blood cells) Erythropoietin is injected into the PD patient regularly to keep the red blood cell count up(3).
 2. **Iron** – Red blood cells are small in size and not able to carry sufficient oxygen if iron is not given with the erythropoietin. Iron is needed to increase the size, amount, and effectiveness of red blood cells (3).
 3. **Active Vitamin D** – Vitamin D (obtained naturally from sunlight and foods) is inactive with kidney failure. Active vitamin D is given to ensure the proper absorption of calcium (3).
 4. **Phosphate Binders** – Dialysis does not eliminate sufficient amounts of phosphorus. Too much phosphorus in the blood results in removal of calcium from the bones, causing weak bones and arteriosclerosis. The binders are given with every meal to bind the phosphorus in the digestive tract and allow elimination with the patient's stool (3).
- **Infection risk** – The skin is a part of the innate immune system. When it is compromised, bacteria and other pathogens may enter the body. It is extremely important to use a mask and proper hand hygiene when accessing the PD catheter (4).
- **Peritonitis** - Peritonitis is inflammation of the peritoneum. The main reason for getting peritonitis is due to the peritoneum is a warm dark area for bacteria to grow. Placing sugar within that environment makes an extreme breeding ground for bacteria to grow (4).



<http://www.mayoclinic.org/tests-procedures/peritoneal-dialysis/home/ovc-20202856>

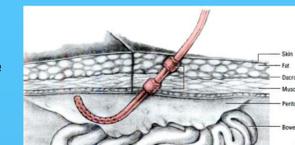


<https://www.pinterest.com/cmcee182/nursing-dialysis/>

How PD Works:

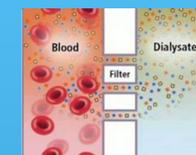
1. Indwelling Catheter:

- PD catheter –
- Flexible silicone tube that enters the abdominal cavity. (2)
 - Allows the dialysate to enter into the peritoneal space of the abdomen.
 - The skin gradually adheres to antimicrobial cuffs that are found in the subcutaneous tissues of your abdominal wall. (8)
 - Placement is done by a simple surgical procedure
 - Available for use within a few weeks. (8)



<http://nursekey.com/peritoneal-dialysis/>

2. Dialysis Solution (Dialysate) and its Dwell Time



<https://www.nephrocare.com>

- **Dialysate** – A special fluid placed inside the peritoneal space.
- The dialysate contains a higher dextrose concentration than blood, but a lower and a lower concentration of the main electrolytes.
 - Main electrolytes found in the dialysate: sodium, calcium, magnesium and chloride. Potassium is not included due to its high concentration in intracellular fluid of the body. The continuous glucose absorption from the dialysate subsequently stimulates intracellular uptake of potassium, mediated by insulin. For this reason potassium pills are taken to maintain correct levels within the blood. (10)
 - To regulate acid/base balance, lactate is used as a buffer to keep normal pH within the body. (9)
- There are 2 main peritoneal transport mechanisms to consider when placing dialysate into the peritoneal cavity:
1. **Diffusion**-
 - Defined as: Solute movement from an area of high concentration to an area of lower concentration (6)
 - Solutes continue to move until concentrations are equal (Equilibrium)
 - Diffusion rate depends on molecule size
 - Smaller molecules diffuse faster (small molecules urea and creatinine which are the main labs to monitor for kidney function) (5)
 - Urea and creatinine has an equilibrium typically reached at around of 4-6 hours (8)
 2. **Osmosis**-
 - Defined as: Water movement from an area of lower solute concentration to an area of higher solute concentration across a semi-permeable membrane (the peritoneum) (4)
 - The main molecule that is used to make osmosis (ultrafiltration, or UF, in dialysis terms) work is dextrose. The dialysate comes in concentration of 1.5%(low UF), 2.5% (medium UF) or 4.5% (high UF)
 - Note: the higher the dextrose concentration the higher pull of toxins and fluid (higher osmolality) (5)
- **Dwell time** – the time needed for the dialysate to remain within the peritoneal cavity (this can range from a few hours to several hours) (7)

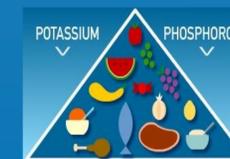
3. Diet

Key points to a Renal Diet-

1. **Proteins** - lose proteins with dialysis, so high quality proteins must be consumed (such as eggs, fish, chicken and other meats) (2)
2. **Potassium and Phosphorus** - found in almost all foods. Potassium rich foods (such as potatoes and tomatoes) need to be limited. Too much or too little potassium can lead to heart issues. Medications called phosphate binders need to be taken with every meal to ensure phosphorus is excreted with the individuals bowel movements. High phosphorus in the blood causes calcium to leak out of your bones and cause weak bones and calcified arteries and veins. (2)
3. **Fluid and Sodium** - Water follows sodium. Avoiding foods high in sodium(such as can foods and processed foods) not only lowers your blood pressure but also decreases the amount of water your body holds on to. It also decreases your desire to be thirsty which helps with fluid that needs to be pulled off during dialysis. (2)
4. **Vitamins and Minerals** – Dialysis washes away some water soluble vitamins and minerals away. Monthly labs are taken to ensure the individual is receiving adequate amounts of vitamins and minerals. If not supplements will be added to there diet. (8)



<http://www.foodlovesfitness.com/2014/05/30/my-healthy-morning-routine/glass-of-water/>



<http://kidneydiet1.blogspot.com/>