

Peritoneal Dialysis (PD)



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Section 1: Introduction

Peritoneal dialysis (PD) is a type of renal replacement therapy that is used for kidney failure. PD helps remove waste products from the blood that the failing kidneys cannot excrete. PD has many advantages as a form of renal replacement therapy, but there are many risks that can lead to life threatening consequences. It is crucial that nurses are informed about the advantages and risks of PD to provide the best patient care and education for patients needing renal replacement therapy. By the end of this course, participants will learn about the process of peritoneal dialysis, patients with end stage renal disease, advantages and risk factors of PD, and patient education to promote optimal outcomes.

Section 2: What is Peritoneal Dialysis

References: 1, 3, 6, 7, 8, 9, 13

Dialysis is renal replacement therapy for end stage renal disease. When the kidneys are failing, they cannot remove toxins and excess fluid from the blood. The buildup of excess toxins and fluid can cause many life threatening complications. Usually patients have chronic kidney disease for years before it progresses to end stage renal disease and necessitates dialysis. However, some patients may experience a rapid decrease in kidney function and require dialysis soon after discovering kidney issues.

Dialysis helps the kidneys remove the toxins and extra fluid, helps keep electrolytes and minerals balanced, and helps control blood pressure. Peritoneal dialysis (PD) is a type of renal replacement therapy that removes the toxins and extra fluids through the blood vessels in the peritoneum. The peritoneum is the tissue that lines the abdomen.

A patient undergoing peritoneal dialysis must first have surgery to place a PD catheter in the abdominal cavity. The catheter has a cuff placed under the skin to help hold it in place, in addition to scar tissue eventually growing around the cuff. The catheter is usually placed to the side of the umbilicus, but is sometimes placed higher up on the abdomen. The PD catheter can be used right away, but is usually placed 3 weeks before the first cycle to allow the incision time to heal. Once the patient has a PD catheter, they will begin cycles of dialysis called exchanges.

A peritoneal dialysis exchange is the process of filling the abdomen with a cleansing fluid through the PD catheter and then draining the abdomen to help excrete toxins and any extra fluid buildup. The cleansing fluid is called dialysate and contains dextrose to help draw the toxins and extra fluid from the blood. Dialysate must remain in the abdomen for a certain amount of time to allow the toxins and extra fluid to be removed from the blood. This is called dwell time and usually lasts 4 to 6 hours. Once the dwell time is completed, the dialysate and waste is drained from the abdomen into a sterile bag.



Types of Peritoneal Dialysis

There are two types of PD: continuous ambulatory peritoneal dialysis (CAPD) and continuous cycling peritoneal dialysis (CCPD).

CAPD involves filling the abdomen with dialysate and being disconnected from any machines or sterile bags until the dwell time is finished. No machine is needed as gravity is used to drain the dialysate. Typically 3 to 5 exchanges are needed per day and each dwell time is about 4 to 6 hours. Patients will have a longer dwell time overnight. A benefit for CAPD is that patients can perform daily activities and have minimal restrictions due to the ability to be disconnected during dwell times.

Patients often coordinate their day to perform exchanges during mealtimes and at bedtime.

CCPD uses a machine to cycle through multiple exchanges overnight. Patients are required to be connected to the machine for 10 to 12 hours during the exchanges. CCPD allows patients to do all their exchanges while sleeping which can allow for more freedom during the day. CCPD can also lower the risk of infection by minimizing the amount of times the PD catheter is accessed.

Both of these types of PD have advantages and disadvantages. Patients should collaborate with their healthcare team and choose which method best suits their lifestyle and medical needs. Patients will need frequent follow up appointments to monitor how well the exchanges are removing toxins and excess fluid.

Healthcare providers may need to make adjustments on the amount of dialysate, the number of exchanges, and the length of dwell times based on the efficacy of the treatment plan. Different tests can be performed to evaluate the efficacy of the PD treatment plan including:

- Peritoneal equilibrium test (PET)
- Clearance test

A peritoneal equilibrium test (PET) can help determine dwell times by comparing blood samples and samples of the dialysate to determine the speed at which the toxins are being removed from the blood. A clearance test measures urea levels in the blood versus in dialysate. Urea is a waste product that is excreted through the kidneys.

Advantages of Peritoneal Dialysis

There are many advantages to PD. PD can be cost saving when compared to other methods of dialysis. Dialysis is a very expensive medical treatment so it is important that healthcare providers take into consideration abilities to cut costs. PD can save costs by the ability to be performed at home versus in a dialysis clinic.

Patients report an advantage of PD is the ability to be performed at home and without a machine which allows more flexibility with travel and daily activities. Patients feel that they have more independence because PD can be performed at home, at work, or while traveling. PD also requires less time overall than going to a dialysis clinic. Other advantages of PD include:

- Less diet and fluid restrictions
- No needles for administration
- Preservation of blood vessels for future access
- Similar to normal kidney function due to the daily exchanges
- Better blood pressure control
- Helps prolong remaining kidney function

Section 2 Personal Reflection

What are some reasons that a patient may choose one type of peritoneal dialysis over the other?

Section 2 Key Words

Dialysis - Renal replacement therapy for end stage renal disease that helps the kidneys remove toxins and extra fluid, helps keep electrolytes and minerals balanced, and helps control blood pressure.

End stage renal disease - A chronic condition that occurs when kidneys cannot remove toxins and excess fluid from the blood and can cause many life threatening complications.

Peritoneal dialysis (PD) - A type of renal replacement therapy that removes the toxins and extra fluids through the blood vessels in the peritoneum.

Peritoneum - The tissue that lines the abdomen.

Peritoneal dialysis (PD) catheter - A catheter surgically placed in the abdominal cavity to be used for peritoneal dialysis.

Peritoneal dialysis exchange - The process of filling the abdomen with a cleansing fluid through the peritoneal dialysis catheter and then draining the abdomen to help excrete toxins and any extra fluid buildup.

Dialysate - The cleansing fluid used in peritoneal dialysis that contains dextrose to help draw the toxins and extra fluid from the blood.

Dwell time - The time that the dialysate must remain in the abdomen to allow the toxins and extra fluid to be removed from the blood.

Continuous ambulatory peritoneal dialysis (CAPD) - A type of peritoneal dialysis that involves filling the abdomen with dialysate and being disconnected from any machines or sterile bags until the dwell time is finished.

Continuous cycling peritoneal dialysis (CCPD) - A type of peritoneal dialysis that uses a machine to cycle through multiple exchanges overnight.

Peritoneal equilibrium test (PET) - A test used to measure the efficacy of peritoneal dialysis by comparing blood samples and samples of the dialysate to determine the speed at which the toxins are being removed from the blood

Clearance test - A test used to measure the efficacy of peritoneal dialysis by measuring urea levels in the blood versus in dialysate.

Section 3: Patients with End Stage Renal Disease

References: 1, 4, 7, 10, 15

End stage renal disease is life threatening without either dialysis or a kidney transplant. Research shows that more than 500,000 people in the United States have end stage renal disease and is the ninth leading cause of death in the United States. These patients are often treated with PD. End stage renal disease can be caused by many different things including:

- Autoimmune diseases
- Diabetes
- Hypertension
- Glomerulonephritis
- Genetic diseases
- Cardiovascular disease
- Serious infections
- Cystic kidney diseases
- Urinary tract obstruction or dysfunction

- Congenital birth defects of the kidney or bladder
- Acute kidney injury
- Nephrotoxic medications such as nonsteroidal anti-inflammatory drugs (NSAIDs)

Patients with certain comorbidities are at higher risk of end stage renal disease progressing more rapidly. These comorbidities include:

- Poorly controlled diabetes
- Polycystic kidney disease
- Hypertension
- Tobacco use
- Ethnicity, especially African American, Hispanic, Asian, Pacific Islander, or American Indian descent
- Family history of kidney failure
- Age
- Frequent use of nephrotoxic medications

Patients with chronic kidney disease should be aware of symptoms of end stage renal disease. Symptoms of end stage renal disease include:

- Confusion
- Dry skin and irritation
- Poor appetite
- Muscle cramping

- Chest pain
- Restless leg syndrome
- Nausea and vomiting
- Dyspnea
- Lower extremity edema
- Decreased urine output
- Fatigue
- Erectile dysfunction
- Platelet dysfunction

Without treatment, patients with end stage renal disease can have many complications including:

- Anemia
- Edema
- Brain damage
- Abnormal electrolyte levels such as hyperkalemia and metabolic acidosis
- Infection
- Nerve damage
- Pulmonary edema
- Seizures
- Stroke

- Bone disease
- Hyperparathyroidism

Glomerular filtration rate (GFR) score helps track the severity of kidney disease. A level of 100 is the highest kidney function and a level of 0 indicates no kidney function. A GFR score of less than 15 indicates end stage renal disease and need for dialysis or kidney transplant. GFR levels are determined based on:

- Age
- Creatinine levels
- Weight
- Gender

End stage renal disease is a chronic progressive disease that affects physical, mental, and financial health. Research shows that patients with chronic diseases have an increased risk of mental health conditions such as depression and anxiety. Patients may feel isolated, lonely, hopeless, and misunderstood. Chronic diseases also increase stress on patients and their families. Frequent doctors appointments, treatments, medications, and insurance claims can cause excessive stress.

The only treatment options for end stage renal disease is dialysis or a kidney transplant. Even with timely treatment, deaths occur in 20% to 50% of patients. Patients must receive education on their treatment options as early as possible in order to make an informed decision. Dialysis and a kidney transplant are both life altering treatment options so patients should not make the decision lightly. It is important for patients to have a good support system and understand the severity of their diagnosis. Many organizations such as the American Association of Kidney Patients and the National Kidney Foundation have support groups for patients

with end stage renal disease. Peer support groups can help connect patients and provide resources for treatment options and coping strategies.

Section 3 Personal Reflection

Discuss the importance of mental health when dealing with a chronic progressive disease such as end stage renal disease.

Section 3 Key Words

End stage renal disease - A chronic condition that occurs when kidneys cannot remove toxins and excess fluid from the blood and can cause many life threatening complications.

Nephrotoxic medications - Medications that can damage kidneys and possibly result in chronic kidney disease.

Glomerular filtration rate (GFR) - A test measuring how well the kidneys are working and can indicate end stage renal disease.

Section 4: Risk Factors and Complications

References: 1, 2, 3, 5, 9, 13

Dialysis has many risk factors and can cause serious complications. There are certain patient populations that are not candidates for PD. Patients who have abdominal scarring from past surgeries or who have hernias are not good candidates for PD due to the risk of placing the PD catheter. Because PD must be performed by the patient at home, patients who do not have good caregiver support or who have trouble caring for themselves are not good candidates for PD.

The use of PD is lower in the United States compared to hemodialysis.

Hemodialysis is a type of dialysis that uses a machine to filter the toxins and extra fluid from the blood and must be performed at a dialysis clinic or hospital.

Research shows that there is a misconception among healthcare providers that the survival rate is better with hemodialysis than PD. There is also concern for long-term complications, the availability of home PD supplies, and patient education needed to successfully use PD at home.

PD has some disadvantages. Patients report that the need to perform PD every day can be time consuming. Other disadvantages include:

- Low body image
- Limitations to swimming or bathing due to the PD catheter and maintaining sterility
- Weight gain
- Storage space required at home for supplies

If patients do not fully understand how to use PD at home, serious complications can occur. Patient education is crucial for PD as patients are doing the majority of treatment and monitoring at home on their own. Complications of PD include:

- Infection
- Weight gain
- Hernia
- Hypotension
- PD catheter malfunctions
- Abdominal distention

PD catheter malfunctions can cause treatment to become less effective. Flow dysfunction can occur when the PD catheter cannot fully drain the abdomen after dwell time. Compression of the catheter tip can occur due to constipation or bladder distention and can also cause flow dysfunction. Excessive scar tissue buildup and catheter leaks are other issues that can cause a PD catheter malfunction. Any PD catheter malfunction needs to be addressed immediately by a healthcare provider and likely will need to be surgically replaced.

Infection is a big risk for PD and is the most common cause of PD failure. Peritonitis is the inflammation of the peritoneum caused by a bacterial infection and can be a complication of PD. Peritonitis can increase the risk of PD failure and can become life threatening. It is important that nurses educate patients on the importance of lowering the risk of infection by using proper aseptic technique when performing PD at home. Symptoms of peritonitis include:

- Abdominal pain
- Abdominal distention
- Cloudy peritoneal fluid
- Presence of white blood cells in PD fluid
- Fever
- Dehydration
- Tachycardia
- Nausea and vomiting
- Dyspnea

Peritonitis is treated as a severe infection as it can quickly spread into the bloodstream and lead to sepsis. Healthcare providers will typically start patients

on broad spectrum antibiotics to treat the infection. Catheter site infections are usually treated with antibiotic cream or oral antibiotics. If the infection does not resolve with antibiotics, patients may have to undergo surgery to remove the PD catheter if it is determined that is the source of the infection.

A hernia is another complication of PD. Hernias are weakened areas in the abdominal muscles and can be caused by the pressure the dialysate puts on the abdomen. Patients should notify their healthcare provider if they discover swelling in the groin or abdomen. Hypotension can be caused by losing too much fluid during exchanges and may require the PD treatment plan to be adjusted. Weight gain is often caused by the dextrose in the dialysate. If patients on PD are diabetic, glucose levels can be difficult to control due to the dextrose levels.

Complications of PD can cause the treatment to become less effective over time. If PD stops working, patients may need to switch to hemodialysis or wait for a kidney transplant.

Section 4 Personal Reflection

How could nurses help encourage the use of peritoneal dialysis in the United States?

Section 4 Key Words

Hemodialysis - A type of dialysis that uses a machine to filter the toxins and extra fluid from the blood and must be performed at a dialysis clinic or hospital.

Peritonitis - The inflammation of the peritoneum caused by a bacterial infection and can be a complication of PD.

Catheter site infection - The presence of bacteria originating from an external catheter in the body.

Hernia - Weakened areas in the abdominal muscles and can be caused by the pressure the dialysate puts on the abdomen.

Section 5: Patient Education

References: 3, 5, 12, 13, 14

Patient education is essential to ensuring that PD is effective. Patients must understand how to use PD as the treatment is performed by the patient or caregiver at home. A patient is trained by a nurse specializing in dialysis. Dialysis nurses typically spend 1 to 2 weeks with patients in a hospital or dialysis clinic to ensure the patient understands everything about PD before starting the treatment at home. Dialysis nurses should use a variety of teaching materials including videos, booklets, teach back method, and manikins for hands-on practice. Any psychosocial barriers such as language, culture, and reading level should be taken into consideration when individualizing education.

Patients must understand the process of PD which includes learning how to prepare the dialysate solution, connect the drainage tube to the PD catheter, connect the dialysis bags, and manage the machine if using CCPD. Patients must also learn how to perform exchanges without a machine in case of a power failure. Patients should understand why they need PD and the potential complications of end stage renal disease. Dialysis nurses should ensure that patients understand the PD prescription from their healthcare provider. A PD prescription includes:

- The number of exchanges per day

- Dwell time
- The type and amount of dialysate to use for each exchange

Patients should be aware of any diet or fluid restrictions prescribed by their healthcare provider. Patients may need to adjust their diet to ensure they are getting appropriate amounts of calories, sodium, phosphorus, protein, and potassium. Patients may be advised to have regular lab draws to monitor electrolyte levels. Based on these results, patients may need to adjust their diet to either increase or decrease their intake of foods high in potassium, sodium, and phosphorus. PD exchanges can cause a feeling of fullness and discourage patients from eating enough calories. Patients should be educated that eating 5 to 6 smaller meals a day can help provide enough calories needed, especially during the first few weeks of starting PD. PD can cause protein loss so patients typically need to increase the amount of protein in their daily diet. Patients should be encouraged to eat protein rich foods including:

- Poultry
- Fish and seafood
- Eggs or egg whites
- Dairy products in small amounts

Patients will need to be aware of their fluid intake to ensure they do not experience fluid overload. Daily weights can also help patients monitor their fluid status. Patients should be instructed to report any sudden weight gain or weight loss to their healthcare provider. Sudden weight gain can indicate fluid overload and sudden weight loss could indicate too much fluid being removed during exchanges. Gradual weight gain is a common side effect of PD due to the dextrose levels in dialysate. Dextrose can be a source of extra calories and patients may need to adjust their diet to account for the extra amount of dextrose. Working

with a registered dietician may help patients find the right diet for them while on PD.

Patients should be encouraged to avoid constipation as straining to have a bowel movement can increase the risk of hernias. Constipation can also cause difficulty with the catheter's ability to drain the abdomen completely. Patients may need to adjust their diet or take medications to prevent constipation.

Infection Prevention

Infection prevention is a major component of PD patient education. Infection is the most common cause for PD failure, so patients must understand the importance of infection prevention. Dialysis nurses should instruct patients on infection prevention measures including:

- Proper handwashing technique
- Do not touch anything unrelated to the PD treatment after washing hands
- Use a face mask when accessing the PD catheter
- Ensure the area where the exchange is performed is clean
- Do not allow children or pets in the room when accessing the PD catheter
- Ensure all doors and windows are closed and fans are turned off when accessing the PD catheter
- Avoid coughing or sneezing on sterile supplies
- Gather all supplies before accessing PD catheter
- Keeping area around the PD catheter clean

Catheter care is an important part of infection prevention for PD. Patients should be instructed to keep the area around the catheter clean by washing it daily with soap and water. The catheter site should be covered with a sterile gauze dressing that should be changed each time the skin is cleaned. It is important for patients to be aware of signs of infection around the catheter site including:

- Redness
- Pain or tenderness
- Discharge around the catheter site
- Firmness of the skin

Patients should be encouraged to use tape or a special device to stabilize the catheter and prevent injury from movement. Patients should use a transfer set to connect the PD catheter to the dialysis bags. A transfer set is a special piece of equipment to help prevent bacteria from entering the connection when performing exchanges.

Patients should be instructed to monitor their dialysate solution for signs of infection. The dialysate should appear to be clear yellow. Cloudy dialysate is a sign of infection and should be reported immediately. If the dialysate appears to be pink, it could indicate that blood is leaking into the dialysate solution. This can occur during the menstruation cycle or after vigorous exercise. A small amount of pink solution is not concerning, but patients should be instructed to report a large amount of pink or red colored solution.

Peritoneal Dialysis Failure

Patients should be aware of signs and symptoms of infection at the catheter site and of peritonitis. Dialysis nurses should instruct patients to report symptoms of infection including:

- Redness, firmness, or tenderness of the skin around the catheter
- Drainage around the catheter insertion site
- Abdominal pain
- Cloudy dialysate solution
- Fever
- Nausea and vomiting
- Diarrhea

Patient education should include the importance of following the PD treatment plan. Skipping exchanges or adjusting the length of dwell times can cause PD failure. If patients are experiencing symptoms indicating that PD is not working and adjustments to the treatment plan do not resolve symptoms, patients may need to be transitioned to hemodialysis or a kidney transplant.

Section 5 Personal Reflection

What are some innovative ways nurses can help teach patients about peritoneal dialysis and ensure they understand how to care for themselves at home?

Section 5 Key Words

Transfer set - A piece of equipment that connects the PD catheter to the dialysis bags to help minimize the risk of infection during exchanges.

Cloudy dialysate - The state of the dialysate solution that can indicate an infection.

Peritoneal dialysis failure - Occurs when patients experience symptoms indicating that peritoneal dialysis is not filtering the blood and adjustments to treatment plans do not resolve the symptoms.

Section 6: Case Study #1

A nurse is caring for a patient with end stage renal disease. The patient has been told that they will need to start dialysis. The physician has recommended peritoneal dialysis for this patient. The patient has a general understanding of dialysis but has a lot of questions about peritoneal dialysis. The patient states “I have only heard of hemodialysis. Why would my doctor want me to start peritoneal dialysis?”

1. What education would the nurse provide to the patient about the advantages of peritoneal dialysis?
2. How would the nurse explain the two types of peritoneal dialysis to the patient?

Section 7: Case Study #1 Review

This section will review the case studies that were previously presented in each section. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What education would the nurse provide to the patient about the advantages of peritoneal dialysis?

PD can be cost saving when compared to other methods of dialysis. Dialysis is a very expensive medical treatment, so it is important that healthcare providers take into consideration abilities to cut costs. PD can save costs by the ability to be performed at home versus in a dialysis clinic. Patients report an advantage of PD is the ability to be performed at home and without a machine which allows more flexibility with travel and daily activities. Patients feel that they have more independence because PD can be performed at home, at work, or while traveling. PD also requires less time overall than going to a dialysis clinic. Other advantages of PD include less diet and fluid restrictions, no needles for administration, the preservation of blood vessels for future access, better blood pressure control, helps prolong remaining kidney function, and is similar to normal kidney function due to the daily exchanges.

2. How would the nurse explain the two types of peritoneal dialysis to the patient?

There are two types of PD: continuous ambulatory peritoneal dialysis (CAPD) and continuous cycling peritoneal dialysis (CCPD). CAPD involves filling the abdomen with dialysate and being disconnected from any machines or sterile bags until the dwell time is finished. No machine is needed as gravity is used to drain the dialysate. A benefit for CAPD is that patients can perform daily activities and have minimal restrictions due to the ability to be disconnected during dwell times. Patients often coordinate their day to perform exchanges during mealtimes and at bedtime. CCPD uses a machine to cycle through multiple exchanges overnight. Patients are required to be connected to the machine for 10 to 12 hours during the

exchanges. CCPD allows patients to do all their exchanges while sleeping which can allow for more freedom during the day. CCPD can also lower the risk of infection by minimizing the amount of times the PD catheter is accessed.

Section 8: Case Study #2

A nurse is caring for a patient who was admitted for complications of end stage renal disease. The patient has a history of hypertension and diabetes and has been on medications to control their blood pressure for several years. The healthcare team has been discussing treatment options with the patient including peritoneal dialysis. The patient has been refusing to start peritoneal dialysis stating “I do not want to be connected to a machine for the rest of my life.” The patient states “My renal disease has been controlled with medications for many years. Why can’t I continue taking those medications instead of dialysis?”

1. What are symptoms of end stage renal disease?
2. What are the risk factors of end stage renal disease?
3. What education would the nurse provide about potential complications of end stage renal disease without adequate treatment?
4. What resources could the nurse provide to support a patient diagnosed with end stage renal disease?

Section 9: Case Study #2 Review

This section will review the case studies that were previously presented in each section. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What are symptoms of end stage renal disease?

Symptoms of end stage renal disease include confusion, dry skin and irritation, poor appetite, muscle cramping, restless leg syndrome, nausea and vomiting, dyspnea, lower extremity edema, decreased urine output, fatigue, erectile dysfunction, and platelet dysfunction.

2. What are the risk factors of end stage renal disease?

Risk factors of end stage renal disease include autoimmune diseases, diabetes, hypertension, glomerulonephritis, genetic diseases, cardiovascular disease, serious infections, cystic kidney diseases, urinary tract obstruction or dysfunction, congenital birth defects of the kidney or bladder, acute kidney injury, and nephrotoxic medications such as nonsteroidal anti-inflammatory drugs (NSAIDs). Patients with certain comorbidities are at higher risk of end stage renal disease progressing more rapidly. These comorbidities include poorly controlled diabetes, polycystic kidney disease, hypertension, tobacco use, ethnicity, especially African American, Hispanic, Asian, Pacific Islander, or American Indian descent, family history of kidney failure, age, and frequent use of nephrotoxic medications.

3. What education would the nurse provide about potential complications of end stage renal disease without adequate treatment?

End stage renal disease is life threatening without either dialysis or a kidney transplant. Without treatment, patients with end stage renal disease can have many complications including anemia, edema, brain damage, abnormal electrolyte levels such as hyperkalemia and metabolic acidosis, infection, nerve damage, pulmonary edema, seizures, stroke, bone disease, and hyperparathyroidism.

4. What resources could the nurse provide to support a patient diagnosed with end stage renal disease?

End stage renal disease is a chronic progressive disease that affects physical, mental, and financial health. Research shows that patients with chronic diseases have an increased risk of mental health conditions such as depression and anxiety. Patients may feel isolated, lonely, hopeless, and misunderstood. Chronic diseases also increase stress on patients and their families. Frequent doctors appointments, treatments, medications, and insurance claims can cause excessive stress.

The only treatment options for end stage renal disease is dialysis or a kidney transplant. Even with timely treatment, deaths occur in 20% to 50% of patients. Patients must receive education on their treatment options as early as possible in order to make an informed decision. Dialysis and a kidney transplant are both life altering treatment options so patients should not make the decision lightly. It is important for patients to have a good support system and understand the severity of their diagnosis. Many organizations such as the American Association of Kidney Patients and the National Kidney Foundation have support groups for patients with end stage renal disease. Peer support groups can help connect patients and provide resources for treatment options and coping strategies.

Section 10: Case Study #3

A patient arrives at the emergency department with complaints of abdominal pain and distention, nausea, and fever. The patient has end stage renal disease and has been on peritoneal dialysis for the past year. The patient completes their dialysis exchanges at home 3 times a day. The patient states they started feeling “off” a few days ago and have had consistent abdominal pain for the past few days.

1. What complication of peritoneal dialysis would the nurse consider for this patient?
2. What education would the nurse provide to the patient about potential complications of peritoneal dialysis?

Section 11: Case Study #3 Review

This section will review the case studies that were previously presented in each section. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What complication of peritoneal dialysis would the nurse consider for this patient?

Peritonitis is a likely complication for this patient based on their symptoms. Symptoms of peritonitis include abdominal pain, abdominal distention, cloudy peritoneal fluid, presence of white blood cells in PD fluid, fever, dehydration, tachycardia, nausea and vomiting, and dyspnea. Peritonitis is treated as a severe infection as it can quickly spread into the bloodstream and lead to sepsis. Healthcare providers will typically start patients on broad spectrum antibiotics to treat the infection. Patients may have to undergo surgery to remove the PD catheter if it is determined that is the source of infection.

2. What education would the nurse provide to the patient about potential complications of peritoneal dialysis?

Infection is a big risk for PD and is the most common cause of PD failure. Peritonitis can increase the risk of PD failure and can become life threatening. A hernia is another complication of PD. Hernias are weakened

areas in the abdominal muscles and can be caused by the pressure the dialysate puts on the abdomen. Hypotension can be caused by losing too much fluid during exchanges and may require the PD treatment plan to be adjusted. Weight gain is often caused by the dextrose in the dialysate. If patients on PD are diabetic, glucose levels can be difficult to control due to the dextrose levels.

Section 12: Case Study #4

A nurse is caring for a patient with end stage renal disease who has just had a PD catheter placed. The patient has spent the past few days in the hospital while the PD catheter heals and education can begin. The nurse is beginning patient education so the patient can be discharged home. The patient states that they are nervous to do their exchanges on their own. They state “How will I know if I am doing it right? I am nervous about messing something up.”

1. What topics should the nurse cover to ensure the patient feels comfortable performing peritoneal dialysis at home?
2. What education should the nurse provide to ensure the patient understands the importance of infection prevention for peritoneal dialysis?

Section 13: Case Study #4 Review

This section will review the case studies that were previously presented in each section. Responses will guide the clinician through a discussion of potential answers as well as encourage reflection.

1. What topics should the nurse cover to ensure the patient feels comfortable performing peritoneal dialysis at home?

Patients must understand the process of PD which includes learning how to prepare the dialysate solution, connect the drainage tube to the PD catheter, connect the dialysis bags, and manage the machine if using CCPD. Patients must also learn how to perform exchanges without a machine in case of a power failure. Patients should understand why they need PD and the potential complications of end stage renal disease. Dialysis nurses should ensure that patients understand the PD prescription from their healthcare provider. Patients should be aware of any diet or fluid restrictions prescribed by their healthcare provider. Patients may need to adjust their diet to ensure they are getting appropriate amounts of sodium, phosphorus, protein, and potassium. PD can cause protein loss so patients typically need to increase the amount of protein in their daily diet. Patients using PD may be referred to a dietician to help individualize dietary needs. Patients will need to be aware of their fluid intake to ensure they do not experience fluid overload. Daily weights can also help patients monitor their fluid status. Patients should be instructed to report any sudden weight gain or weight loss to their healthcare provider. Sudden weight gain can indicate fluid overload and sudden weight loss could indicate too much fluid being removed during exchanges. Patient education should include the importance of following the PD treatment plan. Skipping exchanges or adjusting the length of dwell times can cause PD failure. If patients are experiencing symptoms indicating that PD is not working and adjustments to the treatment plan do not resolve symptoms, patients may need to be transitioned to hemodialysis or a kidney transplant.

2. What education should the nurse provide to ensure the patient understands the importance of infection prevention for peritoneal dialysis?

Infection prevention is a major component of PD patient education. Infection is the most common cause for PD failure, so patients must

understand the importance of infection prevention. Dialysis nurses should instruct patients on infection prevention measures including:

- Proper handwashing technique
- Do not touch anything unrelated to the PD treatment after washing hands
- Use a face mask when accessing the PD catheter
- Ensure the area where the exchange is performed is clean
- Do not allow children or pets in the room when accessing the PD catheter
- Ensure all doors and windows are closed and fans are turned off when accessing the PD catheter
- Avoid coughing or sneezing on sterile supplies
- Gather all supplies before accessing PD catheter
- Keeping area around the PD catheter clean

Catheter care is an important part of infection prevention for PD. Patients should be instructed to keep the area around the catheter clean by washing it daily with soap and water. The catheter site should be covered with a sterile gauze dressing that should be changed each time the skin is cleaned. It is important for patients to be aware of signs of infection around the catheter site including redness, pain or tenderness, discharge around the catheter site, and firmness of the skin. Patients should be encouraged to use tape or a special device to stabilize the catheter and prevent injury from movement. Patients should use a transfer set to connect the PD catheter to the dialysis bags. A transfer set is a special piece of

equipment to help prevent bacteria from entering the connection when performing exchanges.

Patients should be instructed to monitor their dialysate solution for signs of infection. The dialysate should appear to be clear yellow. Cloudy dialysate is a sign of infection and should be reported immediately. If the dialysate appears to be pink, it could indicate that blood is leaking into the dialysate solution. This can occur during the menstruation cycle or after vigorous exercise. A small amount of pink solution is not concerning, but patients should be instructed to report a large amount of pink or red colored solution.



References

1. Mayo Clinic. (2023). Peritoneal dialysis. *Mayo Clinic*. Retrieved from <https://www.mayoclinic.org/tests-procedures/peritoneal-dialysis/about/pac-20384725>
2. Sachdeva, B., Zulfiqar, H., and Aeddula, N.R. (2023). Peritoneal dialysis. *StatPearls [Internet]*. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK532979/>
3. Nall, R. (2021). What to know about peritoneal dialysis. *Medical News Today*. Retrieved from <https://www.medicalnewstoday.com/articles/peritoneal-dialysis>
4. Hansson, J.H. & Finkelstein, F.O. (2020). Peritoneal dialysis in the United States: lessons for the future. *Kidney Medicine*, 2(5). Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7568073/>
5. Jaelani, T., Ibrahim, K., Jonny, J., Pratiwi, S., Haroen, H., Nursiswati, N., and Ramadhani, B. (2023). Peritoneal dialysis patient training program to enhance independence and prevent complications: a scoping review. *International Journal of Nephrology and Renovascular Disease*. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10505035/>
6. Latif, W. (2022). Dialysis - peritoneal. *Medline Plus*. Retrieved from <https://medlineplus.gov/ency/article/007434.htm>
7. Cleveland Clinic. (2020). End-stage renal (kidney) disease. *Cleveland Clinic*. Retrieved from <https://my.clevelandclinic.org/health/diseases/16243-end-stage-renal-kidney-disease#symptoms-and-causes>
8. Klomjit, N., Kattah, A.G., and Cheungpasitporn, W. (2021). The cost-effectiveness of peritoneal dialysis is superior to hemodialysis: updated

- evidence from a more precise model. *Kidney Medicine*, 3(1). Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7873827/>
9. National Kidney Foundation. (2023). Choosing dialysis: which type is right for me? *National Kidney Foundation*. Retrieved from <https://www.kidney.org/atoz/content/choosing-dialysis-which-type-right-me>
 10. Hashmi, M.F., Benjamin, O., and Lappin, S.L. (2023). End-stage renal disease. *StatPearls [Internet]*. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK499861/>
 11. Cleveland Clinic. (2022). Peritonitis. *Cleveland Clinic*. Retrieved from <https://my.clevelandclinic.org/health/diseases/17831-peritonitis>
 12. National Kidney Foundation. (2023). Peritoneal dialysis: what you need to know. *National Kidney Foundation*. Retrieved from https://www.kidney.org/sites/default/files/peritoneal_dialysis.pdf
 13. Burkart, J.M. & Bansal, S. (2023). Patient education: peritoneal dialysis (beyond the basics). *UpToDate*. Retrieved from <https://www.uptodate.com/contents/peritoneal-dialysis-beyond-the-basics#H1>
 14. National Kidney Foundation. (2022). Nutrition and peritoneal dialysis. *National Kidney Foundation*. Retrieved from https://www.kidney.org/sites/default/files/11-10-0140_nutrition_peritoneal_dialysis.pdf
 15. Lockett, E. (2021). Finding support when living with chronic kidney disease. *Healthline*. Retrieved from <https://www.healthline.com/health/kidney-disease/support-for-chronic-kidney-disease>



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