Peritoneal Dialysis

Today’s Schedule
- What is peritoneal dialysis?
- Access
- Three stages to PD
- Troubleshooting
- Documentation
- Sampling
- Exit site care
- Infection
- Getting supplies
Basics of peritoneal dialysis

- **Peritoneal dialysis** utilizes the peritoneal membrane to act as a dialysis membrane due to the rich blood supply and large surface area that it covers in the abdominal cavity.

- Dialysate solution containing glucose and solutes instilled through a catheter into the abdominal cavity.

- Excess fluid and waste products can be removed through the processes of diffusion and osmosis.

Why is osmosis important?

- The osmolarity of dextrose solution dictates how much fluid is removed during PD.
- The lower the glucose concentration, the less fluid removed.
- Solutions available in 1.5%, 2.5%, 4.25% and Icodextrin (7.5%).
What is removed from the peritoneum?

From the internal circulation INTO the peritoneal cavity...

Water
Urea
Chloride
Sodium
Potassium
Creatinine

Five necessary components

- Patent catheter access to the peritoneum
- Adequate peritoneal surface area
- Adequate peritoneal capillary blood flow
- Peritoneal dialysis solution
- Adequate solution delivery system
Peritoneal Dialysis Catheter

- Placed in OR
- May take up to 6 weeks for catheter tract to heal and catheter to be securely positioned in the pelvis
- Catheter should not be used until 2 weeks post-op

Baxter

- Shadyside uses the Baxter system
- The system is easily identifiable because of the light blue cap on the catheter
- Conversion kits are available to convert any other brand catheter to the Baxter system while the patient is in the hospital
Getting ready

- Assess your patient
  - Vital signs
  - Estimated dry weight vs. today’s weight
  - Edema
  - I & Os
  - Lung sounds
  - Abdominal pain/distention

Three phases of peritoneal dialysis

DRAIN

FILL

DWELL
Drain the patient

- Average 20 minutes to drain, though may take up to one hour
- Observe the effluent for clarity
  - Cloudy? Possible infection- might need antibiotics
  - Fibrin? Protein sloughing- might just need heparin
  - Bloody? In women this may be normal during menses, otherwise ABNORMAL

- Normal is clear, yellow effluent
  - If it is not clear, CALL NEPHROLOGIST

Not draining as expected?
- This is where most troubleshooting occurs

Fill the patient

- Takes about 5-20 minutes to fill
- Time of instillation depends on patient condition and volume of dialysate solution to be infused
- Try to maximize fill volume, but be aware of patient size and comfort during the fill
Dwell

- Maximize dwell times to improve clearance

**PD Exchange**

- DRAIN
- FILL
- DWELL

Factors affecting solute diffusion

- Surface area
- Peritoneal permeability
- Solute characteristics
- Concentration gradient
- Temperature of dialysis solution
- Capillary blood flow
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>WHAT TO DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restlessness, numbness, tingling, itching</td>
<td>Underdialyzed</td>
<td>Check chemistries and notify nephrologist</td>
</tr>
<tr>
<td>Inadequate outflow</td>
<td>Constipation, fibrin plug, partially closed clamps or kinks</td>
<td>May need enema or stool softener, inspect for fibrin clots in bag, check for kinked/clamped tubing</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Too much sodium/fluid</td>
<td>Check patient weights for significant loss or gain. Notify MD for need to restrict sodium and fluid intake</td>
</tr>
<tr>
<td>Shoulder pain</td>
<td>Air in peritoneal cavity, inflow too fast, catheter positional</td>
<td>Prime the transfer set tubing before infusion, slow the rate of infusion, notify nephrologist of pain</td>
</tr>
<tr>
<td>Muscle cramps</td>
<td>Excessive removal of sodium and fluid</td>
<td>Application of heat or massage may relieve pain, give saltines or broth, call renal MD for change in % or alternate with a lower dextrose %</td>
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<tr>
<td>Fever</td>
<td>Peritonitis</td>
<td>Assess effluent for cloudiness, assess abdomen for pain or distension, call Renal MD</td>
</tr>
<tr>
<td>Headache</td>
<td>Hypertension, anxiety</td>
<td>Call Renal MD if hypertension persists after ultrafiltration and/or administration of BP medication</td>
</tr>
<tr>
<td>Weak, shaky, sweaty, hypotension</td>
<td>Excessive removal of fluid and/or hypoglycemia</td>
<td>Check blood glucose, call Renal MD</td>
</tr>
<tr>
<td>Bleeding from exit site or bloody effluent</td>
<td>Catheter exit site infection, small capillary rupture from abdominal straining or menstrual cycle</td>
<td>Call Renal MD</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>Hypertension, hypotension, or peritonitis</td>
<td>Assess patient temperature, assess effluent for cloudiness, call renal MD</td>
</tr>
<tr>
<td>Rectal pain</td>
<td>Catheter position</td>
<td>Decrease inflow, positional change, notify Renal MD</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>Fluid overloaded, anemia</td>
<td>Check patient weights for significant loss or gain; check HCT, notify renal MD</td>
</tr>
</tbody>
</table>
Documentation

- Print PD Flow Sheet from Print on Demand
- Document vital signs in eRecord
- Document daily weight in eRecord and on flow sheet
- Start flow sheet with first AM exchange (usually 6 or 7am)
- ALWAYS start with a “drain”
- Document volume drained and appearance of effluent
- THE VOLUME DRAINED SUBTRACTED FROM THE VOLUME INSTILLED WITH THE LAST EXCHANGE =
  **ACTUAL PATIENT FLUID REMOVAL**
  *Document this amount in I&O as Actual Patient Fluid Removal (found under ultrafiltrate)*
- Document dialysate concentration, volume instilled
- Document output after EVERY exchange

Sending Effluent Samples

- Gather povidine iodine solution and 4 x 4s or betadine swabs, blood culture bottles, two lavender top tubes, 30cc syringe, 18 gauge needle, and pink vacutainer needleless transfer device
- AFTER the fill stage, put a clamp on the short “Y” connector tubing next to the patient connector
- Aseptically disconnect the system from the patient and cap off patient
- Reverse the position of the bags by placing the full drain bag higher than the empty fill bag.
- Allow enough effluent necessary for samples ordered to drain back into dialysate bag and then clamp tubing
Sending Effluent Samples

- Scrub the medication injection port with betadine and allow at least 5 minutes to dry
- Use sterile gauze to absorb and remove excess povidine iodine that may be on the sampling port
- Insert needle attached to syringe into the sampling port and withdraw effluent amount needed for test
- Inject 10 cc into each blood culture bottle using the pink needleless vacutainer
- Inject remainder of effluent into the two lavender top tubes
- Label and send specimens to the lab

Medication Additives

- Medications usually added:
  - Heparin, antibiotics, potassium and/or insulin
- Pharmacy will mix additives when ordered
Exit site care

- Inspect catheter exit site and tunnel at least every shift and before and after each exchange
- Cleanse the site *Every Day*
- Cleanse prn if site appears dirty or wet
- Use antibacterial cleansing agent such as soapy water to clean and wash off residue
- Do not forcibly remove rust, scab, or cuticle
- Apply antibacterial ointment as ordered
- Cover with non-occlusive sterile 4X4 gauze
- Immobilize catheter

Infection

#1 concern with peritoneal dialysis

Reason why gloves, masks, and controlled environment are essential for exchange

Red/pink = NORMAL

Pus exudate= INFECTION
Where do I get supplies?

- Pharmacy will fill and dispense all PD solutions to the nursing unit with a patient medication label attached
- Take the 4 West PD cart to the patient room (leave cart outside room if patient is in isolation)
- If the 4 West cart is in use, obtain a cart from 6 Main
- A heater should be kept with each cart
- Get replacement supplies from the PD stock room on 6 Main

Let’s try it ourselves!
References


Farina J. When PD is the only choice... A trusting relationship between nurse and patient fosters positive outcomes! Nephrol Nurs J. 2004 Sep-Oct;31(5):590-1.


References


Nasso L. Our peritonitis continuous quality improvement project: where there is a will there is a way. CANNT J. 2006;16(1):20-3.


