Comparison of Peritoneal Dialysis Modalities

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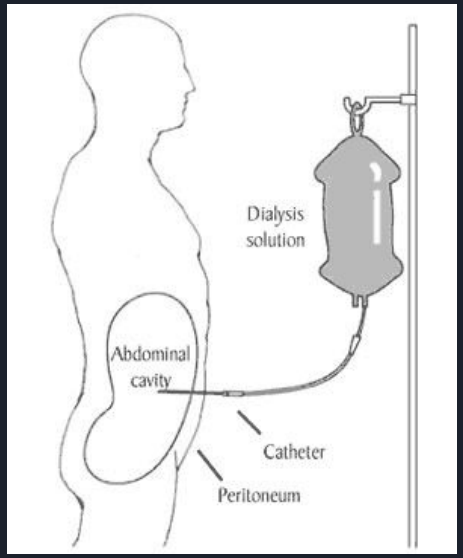
Situation

- What are the benefits and drawbacks of Bayhealth's current method of peritoneal dialysis?
- Should Bayhealth invest in automated peritoneal dialysis machines?
- For patients on automated peritoneal dialysis at home, should Bayhealth institute a policy that allows the patient to control their peritoneal dialysis regimen while inpatient ("the insulin pump policy")

Background

What is peritoneal dialysis?

- Catheter is placed into the patient's peritoneal cavity.
- Uses principles of fluid and electrolyte balance between semi permeable membranes to draw out excess fluids and electrolytes
- Modality is chosen by the patient based on their lifestyle

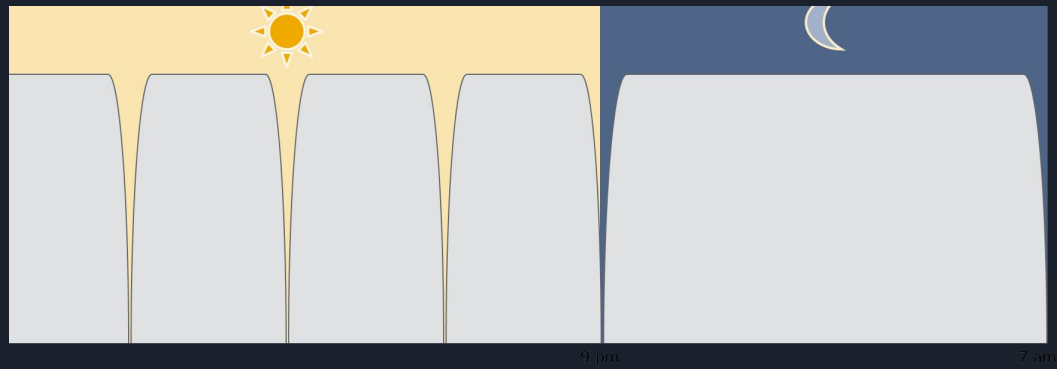


What is peritoneal dialysis? (cont)

- **Fill**: The process of filling the abdomen with dialysate
- **Dwell**: The period of time where dialysate is left in the abdomen. During this time, fluid and electrolyte exchanges occur
- **Drain**: The process of emptying the solution (effluent). Effluent contains the dialysate, waste products and ultrafiltrate.

Continuous Ambulatory Peritoneal Dialysis (**CAPD**)

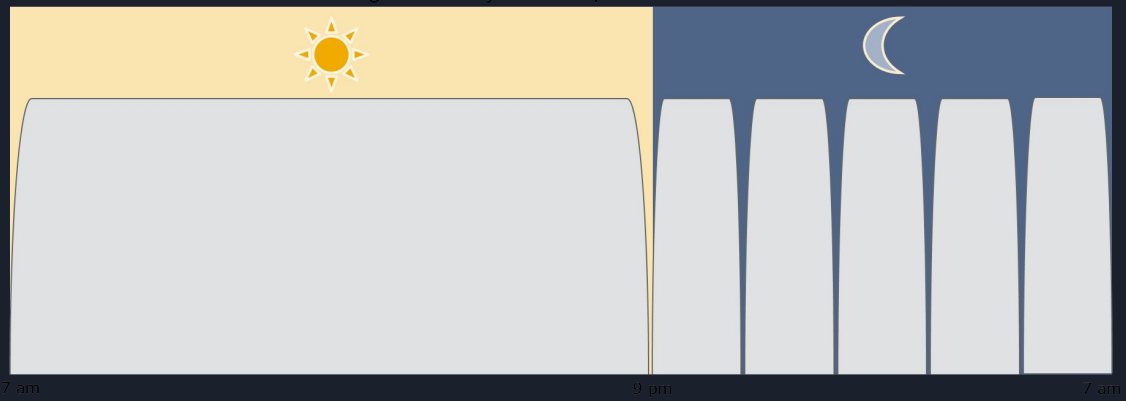
- Manual dialysis -4-5 exchanges a day and a longer session at night
- Gravity-based



Automated Peritoneal Dialysis (**APD**)

- Machine performs the PD sessions -usually at night
- Ability to complete more frequent exchanges

Figure 2: Dialysate flow pattern for CCPD



How Bayhealth Does PD

- 24-hour CAPD
  - Breaking up the frequency of the PD through a 24-hour period
  - APD patients will be switched to CAPD while inpatient -no equipment available for APD
- RN's responsibility
  - Obtaining supplies from Central
  - Maintaining sterility throughout the CAPD session
  - Assessing quality and amount of effluent, assuring proper amount and type of influent go to the patient
    - *Possibility for error?*
  - ***STAYING WITH THE PATIENT THROUGHOUT THE CAPD SESSION***
    - *What if a session takes an hour, and the RN is doing 4 sessions during their shift?*

“The insulin pump policy” (B6000.155)

- Self management of insulin administration via pump under certain circumstances
  - A&Ox4, ability to demonstrate operating the pump, recognizing s/s of complications (hypo/hyperglycemia, lipodystrophy, infection), ability to communicate with RN about amount of insulin used per bolus
  - Contraindications: Altered mental status, risk of suicide, refusal of patient to participate in care, use of general anesthesia and other procedures where the patient is disconnected for >2 hours

- If the patient has the supplies and mental ability to complete their PD sessions, should a policy be created to permit them?
  - Similar policy changes at Bayhealth underway for inpatient Lifevests?

Assessment

Effectiveness

- Automated PD more effective at removing creatine (but increased risk of hyponatremia and hyperglycemia) when comparing CAPD vs APD
  - Outpatient perspective - *Could we say that switching a APD patient to CAPD while impatient can reduce the effectiveness of their PD regimine?*

- 2007 Cochrane review - no significant difference noted between APD vs CAPD
  - Further research needs to be done
  - *Looking at the situation more from a better utilization of resources (nursing staff) versus efficacy of the PD modality*

Cost analysis

- One study - Higher cost to perform APD vs CAPD procedure
  - Avg cost $4270 in CAPD… $5471 in APD
  - No difference in quality of life between APD vs CAPD

- Second study - Higher direct medical costs with APD vs CAPD, but not statistically significant
  - Highest percentage of direct medical costs related to dialysis procedure

TABLE 4

Annual Per-Person Direct Medical Costs in US Dollars for Resource Utilization by Dialysis Modality, in 2008 and 2010

Resource	Annual per-patient cost [mean (95% confidence interval)] 2008 CAPD	2008 APD	2008 *p* Value	2010 CAPD	2010 APD	2010 *p* Value
Outpatient clinic visits	279 (201 to 358)	282 (168 to 396)	0.89	351 (241 to 461)	327 (231 to 422)	0.61
Emergency room visits	130 (75 to 185)	134 (83 to 226)	0.84	177 (95 to 260)	139 (89 to 187)	0.79
Dialysis procedures	6 071 (5 769 to 6 373)	7 084 (5 961 to 8 207)	0.001	5 697 (5 643 to 5 751)	7 105 (7 022 to 7 188)	<0.0001
Medication	1 674 (1 109 to 2 238)	1 843 (975 to 2 711)	0.69	1 778 (1 174 to 2 382)	2 052 (1 156 to 2 948)	0.40
Laboratory tests	92 (69 to 115)	91 (46 to 135)	0.33	156 (72 to 239)	126 (86 to 167)	0.89
Hospitalization	5 458 (4 143 to 6 774)	4 270 (3 415 to 6 437)	0.54	6 255 (4 620 to 7 890)	6 171 (4 847 to 7 494)	0.79
Surgery	1 177 (891 to 1462)	1 007 (761 to 1 253)	0.55	1 364 (891 to 1462)	1 336 (1 009 to 1 663)	0.95
TOTAL	14 798 (12 923 to 16 674)	15 389 (12 612 to 18 167)	0.58	15 476 (13 755 to 17 197)	17 279 (15 269 to 19 289)	0.13

Clinical Practice Guideline: The Renal Association

- Indications for PD: Children, people with residual kidney function without significant comorbidities
- Both CAPD and APD should be available
  - APD creates more time for patient to spend time with family/employment, but decreases sleep
  - *Implications if an APD patient has to do CAPD inpatient?*
    - Per CPG - no difference in outcomes from selecting APD/CAPD as initial modality
- Recommends that patients (and/or caregivers) should undergo annual training
  - *Training requirements at Bayhealth? "Being fed to the wolves"?*

Recommendation

- Further research is needed on this topic
  - Outdated resources, looking more from an outpatient perspective
- No significant benefit associated with APD vs CAPD
  - → better utilization of resources elsewhere than investing in APD machines for patients who are on APD at home?

- *Recommendation*: **Implementation of a similar "insulin pump policy" to PD patients**
  - Promote patient independence, better utilization of nursing resources, minimal financial costs for the Bayhealth company.
- **Implement certain units as "PD units"** if the RN needs to perform PD for the patient
  - For units that can perform PD -provide CAPD training as a part of orientation schedule/required task to reduce the risk of errors associated with performing manual PD

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