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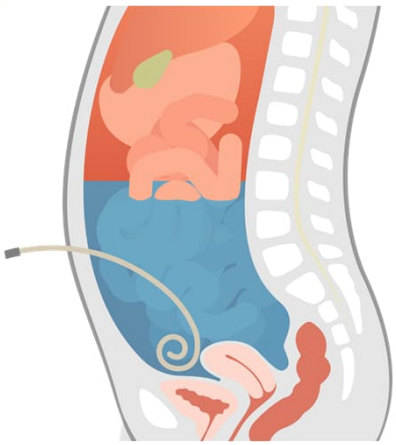

CAPD vs. APD:
The Right Prescription, for the Right Patient, at the Right Time

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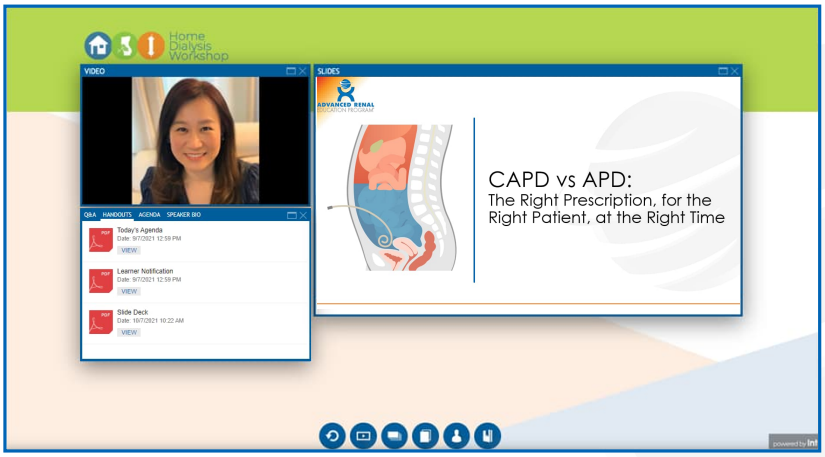

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May 5	When to Initiate CKRT Case Studies: Early vs. Late AKI Transition to ESKD Studies
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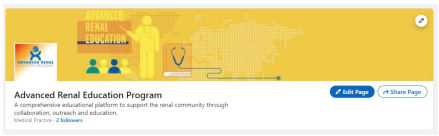

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- This educational program has been developed by the Medical Information and Communication Office of the Fresenius Medical Care Renal Therapies Group.
- It is intended to provide pertinent data to assist health care professionals in forming their own conclusions and making decisions.
- It is not intended to replace the judgment or experience of the attending physician or other medical professional.
- The treatment prescription is the sole responsibility of the attending physician.
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Home Dialysis Workshop Webinar Series

CAPD vs. APD

The Right Prescription, for the Right Patient, at the Right Time

Thursday, April 7, 2022
12:00 PM – 2:00 PM, ET

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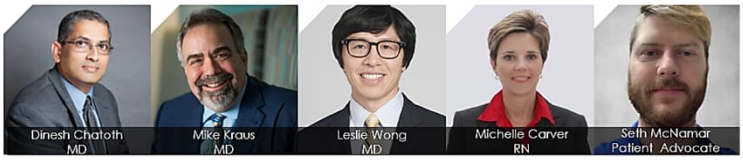

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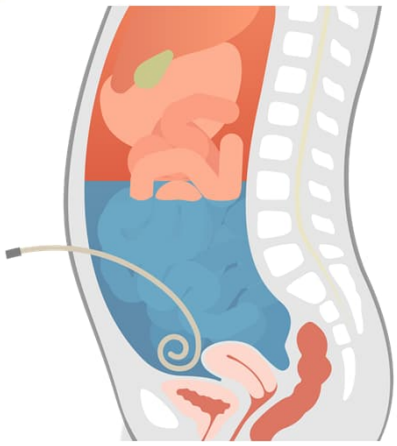

CAPD vs. APD:

The Right Prescription, for the Right Patient, at the Right Time

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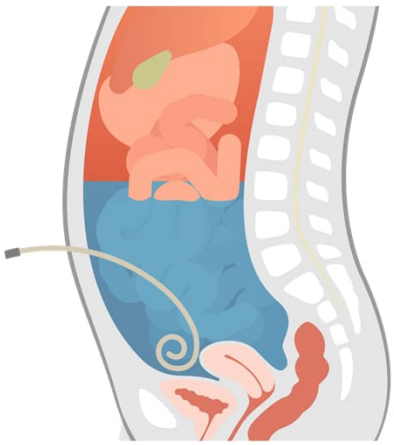
Course Objectives



- ✓ Review trends in CAPD and APD prescriptions
- ✓ Compare outcomes of CAPD and APD in different patient populations
- ✓ Discuss the importance of individualizing PD prescriptions for the patient's clinical and quality of life needs
- ✓ Review common myths in peritoneal dialysis

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PD Modalities[1]

CAPD
Continuous Ambulatory PD

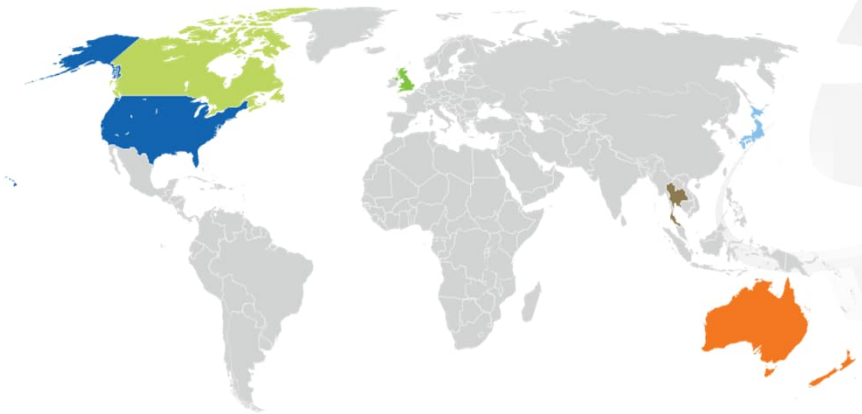
- Several manual exchanges per day
- Typically, continuous 24 hr/day dialysis
- Lower-dose options (incremental, palliative) may include dry periods (IAPD – intermittent ambulatory PD)
- Dwell times generally 4 – 6 hours during the day, with long overnight dwell

APD
Automated PD

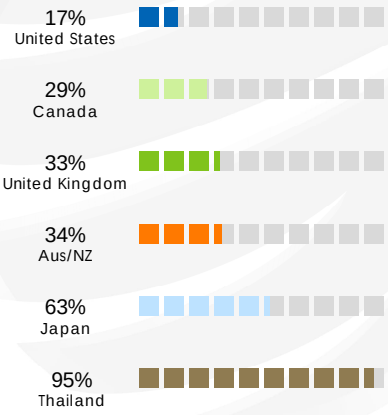
- Exchanges performed by automated cycler overnight
- Numerous programming options available (CCPD, NIPD, Tidal, PD Plus)
- Intermittent (dry day) or continuous therapy
- Dwell times generally 1 – 3 hours overnight
- Daytime can be a single long dwell or broken up

[1]Blake PG, Daugirdas JT. *Handbook of Dialysis*. 5th ed. 2015:464-482.

Prescribed Modalities Vary Widely



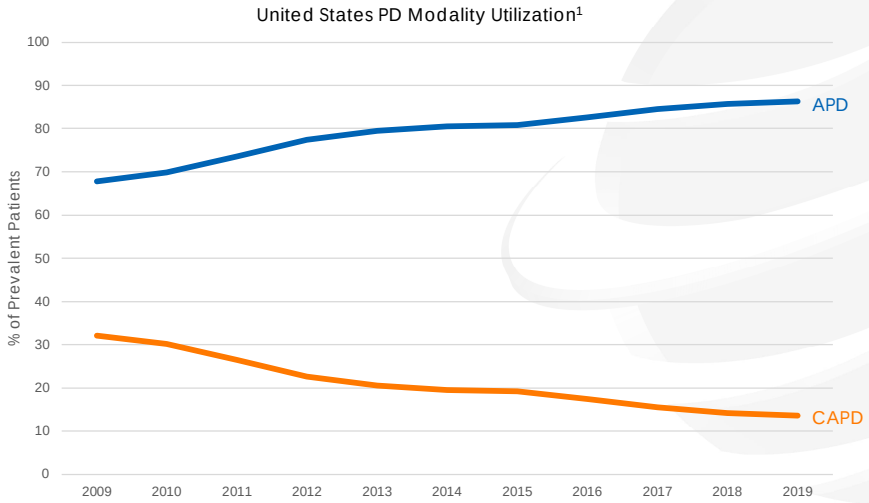
Prescribed CAPD[1*]



*Data collected 2014 - 2017

[1]Wang AY-M, et al. *Perit Dial Int*. 2020;40(3):310-319.

CAPD Utilization is Declining



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[1]*USRDS Annual Data Report* 2021

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PD Prescriptions are Often Generic

CAPD Prescriptions in the US[1]:

- 75% use 4 exchanges
- Average total volume: 8.1 L

APD Prescriptions in the US[1]:

- 81% use 4-5 exchanges
- Average total volume: 11.9 L

... but your patients are not!!

14

[1]Wang AY-M, et al. *Perit Dial Int*. 2020;40(3):310-319.

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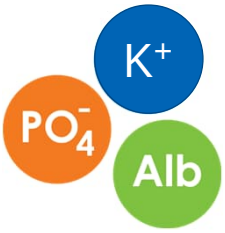
Components of High Quality, Goal-Directed PD Care[1]

Maximized quality of life & minimized therapy burden

Fluid balance, BP control, cardiac markers acceptable



Biochemical & nutritional markers within acceptable ranges

Kt/V

Small solute clearance targets are met

15

[1]Brown EA, et al. *Perit Dial Int*. 2020;40(3):244-253.

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APD vs. CAPD

Studies have generally shown no significant differences between CAPD and APD for:

- Mortality[1,2]
- Volume management[1,2]
- Hospital admissions[1]
- Technique survival[1]
- Risk of peritonitis[1]
- Fluid leaks or hernia[1]
- Loss of RKF*[2]
- Health-related QoL[2]

*Controversial, some smaller observational studies have shown faster loss of RKF with APD, but a majority do not show a difference[2].

16

[1]Rabindranath KS, et al. *Cochrane database Syst Rev*. 2007;2007(2):CD006515.
[2]Bieber SD, et al. *Am J Kidney Dis*. 2014;63(6):1027-1037.

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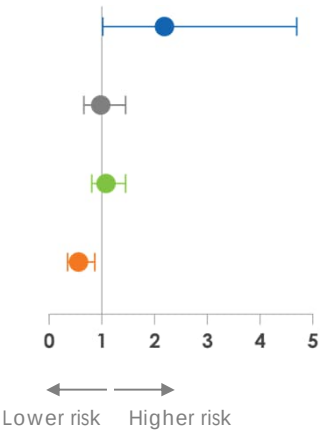
APD vs. CAPD: A Closer Look at Survival[1]

ANZDATA Registry

1999 – 2004

3,906 Patients

Relative Hazard of Patient Survival
APD vs. CAPD, HR (95% CI)



Low
n=196

Low-average
n=1,146

High-average
n=1,936

High
n=628

- **Low Transporters on APD**
  Significantly higher risk of mortality
- **Average Transporters on APD**
  No difference between modalities
- **High Transporters on APD**
  Significantly lower risk of mortality

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[1]Johnson DW, et al. 2010;25(6):1973-1979.

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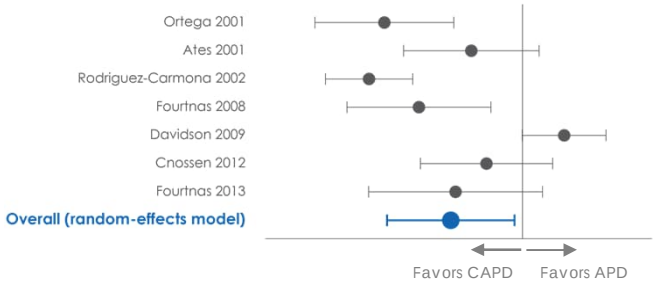
APD vs. CAPD: A Closer Look at Sodium Removal[1]

Dialytic sodium removal in CAPD is significantly greater than APD, while there is no difference in ultrafiltration volume

Meta-analysis of Studies Comparing Sodium Removal in CAPD and APD



	CAPD	APD
Dialytic Sodium Removal	141.3 $^{mEq}/_{day}$ (107.6 – 174.9)	86.2 $^{mEq}/_{day}$ (57.3 – 115.1)
	p=0.015	
Ultrafiltration	1,122.6 $^{mL}/_{day}$ (891.2 – 1354.0)	893.6 $^{mL}/_{day}$ (823.0 – 964.2)
	NS	

18

[1]Borrelli S, et al. *J Nephrol*. 2019;32(2):231-239.

18

APD vs. CAPD: A Closer Look at Phosphate Removal

- Low/low-average transporters have lower P clearance than high/high-average transporters[1]
- CAPD is associated with greater peritoneal P clearance and lower serum P levels[1,2]

Peritoneal Phosphate Clearance[1]

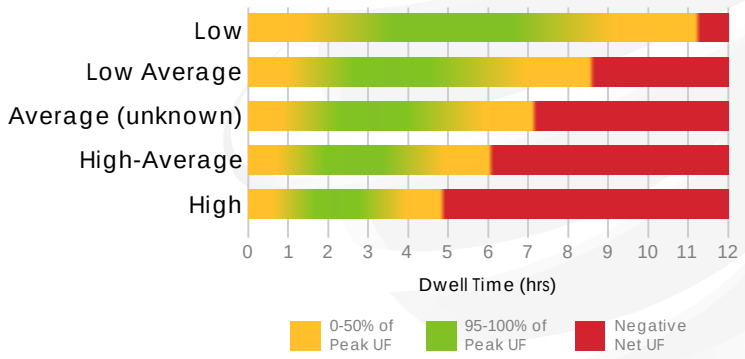
	CAPD	APD + Day Dwell	*p*
# Exchanges	4 (2 – 5)	6 (4 – 8)	
Total infused volume (L)	8 (3 – 14)	11.5 (4 – 22.5)	
Weekly peritoneal P clearance (L/week/1.73m^2)	41.4 (14.8 – 76.9)	33.4 (8.3 – 117.5)	0.001
Weekly peritoneal P clearance, High/HA	44.8 (18.4 – 76.9)	36.4 (16.3 – 89.7)	0.01
Weekly peritoneal P clearance, Low/LA	36.6 (14.8 – 67.1)	29.3 (8.3 – 117.5)	0.01

[1]Courivaud C, Davenport A. *Perit Dial Int*. 2016;36(1):85-93.
[2]Debowska M, et al. *Sci Rep*. 2020;10(1):17504.

Individualization of Dwell Time

- Peak UF correlates with:
  - Sodium removal[1-3*]
  - Urea clearance[4]
- Peak UF depends upon[5]:
  - Transport type
  - PD solution used
- Avoid:
  - Overly long dwells that result in reabsorption
  - Inefficient short cycles that result in inadequate UF, Kt/V, and sodium sieving

Ultrafiltration Profiles[5]
1.5% Dextrose PD Solutions



Note: All lines shift to the right with 2.5% exchanges

*Study results have varied. One study suggested the correlation between UF and sodium removal only occurs with CAPD[2], while others show a correlation for both modalities[1,3].

[1]Maharjan SRS, Davenport A. *J Nephrol*. 2019;32(6):1011-1019. [2]Borrelli S, et al. *J Nephrol*. 2019;32(2):231-239.
[3]Wang T, *Kidney Int*. 1997;52(6):1609-1616. [4]Akonur A, et al. *Perit Dial Int*. 2013;33(6):646-654. [5]Mujais S, Vonesh E. *Kidney Int Suppl*. 2002;(81):S17-S22.

Modality and Prescription Considerations

Transport Type	% of US Patients[1]	Estimated Peak UF[2] (hours)		Estimated Peak Urea Clearance* (hours)		Prescription Implications
Low	16	1.5%	3.5 – 6.0	1.5%	5.5 – 8.0	CAPD facilitates longer dwell times necessary for clearance. Larger dialysate volumes may be required with no RKF.
		2.5%	5.0 – 9.5	2.5%	6.5 – 10.0	
		4.25%	6.0 – 12.0	4.25%	7.5 – 11.5	
Low-Average	69	1.5%	2.0 – 4.5	1.5%	3.5 – 7.0	CAPD or APD could be appropriate. Modality can be largely based on patient preference
		2.5%	3.0 – 7.5	2.5%	4.0 – 8.0	
High-Average		4.25%	4.0 – 9.5	4.25%	4.5 – 9.5	
High	15	1.5%	1.5 – 2.5	1.5%	2.0 – 3.5	APD facilitates shorter dwell times necessary to prevent fluid reabsorption. Mid-day exchange or icodextrin may be required.
		2.5%	2.5 – 4.5	2.5%	2.5 – 3.5	
		4.25%	3.0 – 6.0	4.25%	3.0 – 4.0	

*Peak urea clearance was calculated using the methods described by Akonur[3] and based on the predicted ultrafiltration volumes of Mujais[2].

21

[1]Mehrotra R, et al. *Clin J Am Soc Nephrol*. 2015;10(11):1990-2001. [2]Mujais S, Vonesh E. Profiling of peritoneal ultrafiltration. *Kidney Int Suppl*. 2002;(81):S17-S22. [3]Akonur A, et al. *Perit Dial Int*. 2013;33(6):646-654.

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Benefits and Challenges[1]

CAPD

- Potential Benefits
  - Simple
  - Shorter training time
  - Emergency preparedness
  - Ease of travel
  - Better sleep
- Challenges
  - Workload and burnout
  - Exchange schedule fitting into daily life
  - Lower dwell volume during waking hours

APD

- Potential Benefits
  - Fewer hands-on procedures
  - Lower burnout
  - Free days may be easier for work or school
- Challenges
  - Requires machine
  - Technical training
  - Sleep interruption

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[1]Blake PG, Daugirdas JT. *Handbook of Dialysis*. 5th ed. 2015:464-482.

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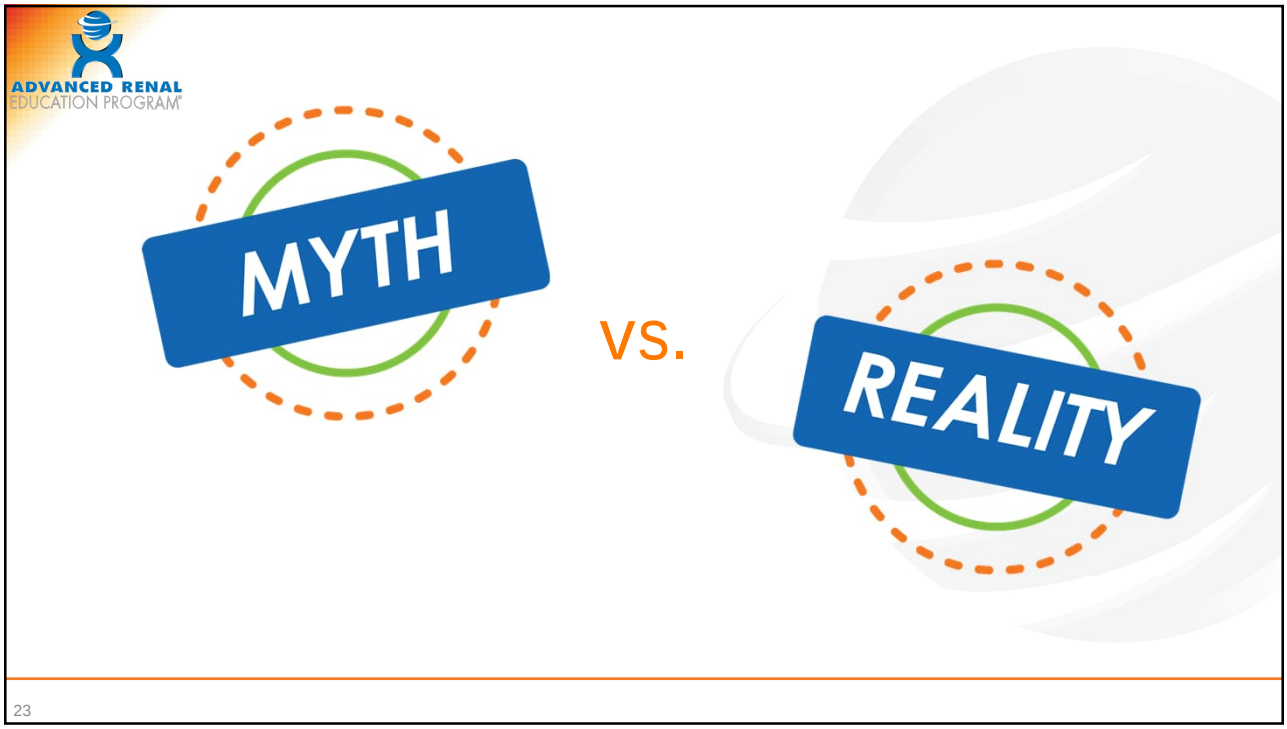

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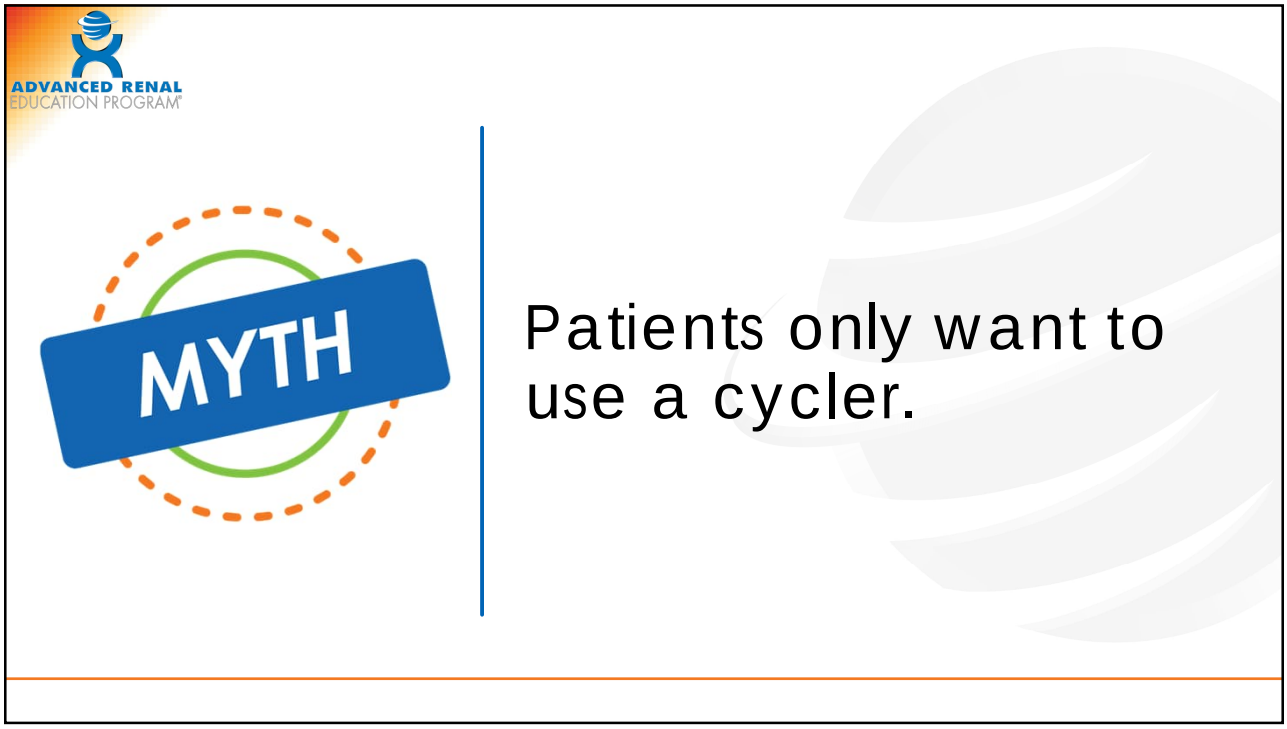

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APD is easier.

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CAPD patients have higher peritonitis rates.

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CAPD is only good for incident or incremental start patients.

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CAPD is too disruptive to daily life.

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APD is easier to individualize.

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CAPD is only for low transporters.

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APD won't interrupt sleep.

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RKF is required to do CAPD.

32

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Low transporters cannot do APD, high transporters cannot do CAPD.

33

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Daytime dwells are uncomfortable and lead to hernias.

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Phosphorus removal is equivalent between CAPD and APD.

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Clinical Takeaways

- ✓ For a majority of PD patients, either APD or CAPD can be appropriate
- ✓ CAPD is associated with better sodium and phosphate removal than APD
- ✓ PD prescriptions should be individualized for a patient's clinical and quality of life goals
- ✓ Both CAPD and APD prescriptions can adapted to the patient's transport type

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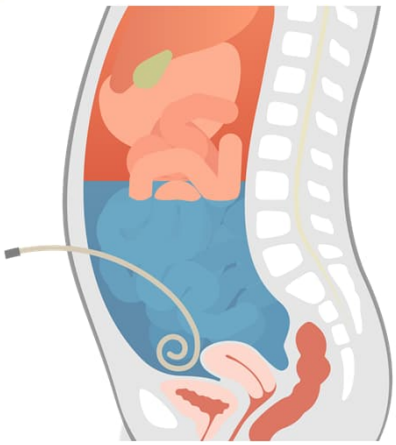

Roundtable Discussion

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