Obese Diabetic PD Patient

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Associates in Kidney Care
Des Moines, IA
Average DaVita PD BMI Across the US

* Snappy Data Dec’19 active PD patients
Laparoscopic Cath placement
Paramedian approach
Rectus sheath tunneling of deep cuff
Selective Omentopexy
Extended S/C Cath tract
Exit site: upper abd or parasternal
Exit site: Localize in erect posture
Initial Low Vol exchanges
Icodextrin for long-dwell
Dextrose-based: ≤ 20% of total daily energy intake
Glycemic control in diabetic CAPD patients assessed by continuous glucose monitoring system (CGMS).

\[ r^2 = 0.82, \quad P < 0.0001. \]
OBESITY IS A RISK FACTOR FOR PERITONITIS IN THE AUSTRALIAN AND NEW ZEALAND PERITONEAL DIALYSIS PATIENTS

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>Underwt BMI &lt;20kg/m²</th>
<th>Normal 20-24</th>
<th>Overwt 25-29</th>
<th>Obese &gt;30</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>1215</td>
<td>4123</td>
<td>3291</td>
<td>1839</td>
<td></td>
</tr>
<tr>
<td>1DM</td>
<td>5%</td>
<td>7%</td>
<td>6%</td>
<td>4%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>2DM</td>
<td>4%</td>
<td>21%</td>
<td>36%</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>CAD</td>
<td>34%</td>
<td>40%</td>
<td>44%</td>
<td>45%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PVD</td>
<td>26%</td>
<td>28%</td>
<td>33%</td>
<td>32%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HTN on start</td>
<td>82%</td>
<td>86%</td>
<td>88%</td>
<td>89%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Peritonitis rate: per pt year</td>
<td>0.69</td>
<td>0.79</td>
<td>0.88</td>
<td>1.06</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

SP McDonald et al: Perit Dial Int 2004; 24: 340-6
The Relationship Between Body Mass Index and Organism-Specific Peritonitis

### Australian Study

<table>
<thead>
<tr>
<th>BMI Quartile</th>
<th>&lt;23.3</th>
<th>23.3-26.6</th>
<th>26.7-30.5</th>
<th>&gt;30.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referent &gt;1300 episodes</td>
<td>HR</td>
<td>p</td>
<td>HR</td>
<td>p</td>
</tr>
<tr>
<td><strong>UNIVARIATE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any Peritonitis</td>
<td>1.08</td>
<td>0.55</td>
<td>1.02</td>
<td>0.89</td>
</tr>
<tr>
<td>Any Gm+ve P</td>
<td>1.07</td>
<td>0.68</td>
<td>0.96</td>
<td>0.78</td>
</tr>
<tr>
<td>Coag Neg P</td>
<td>1.79</td>
<td>0.03</td>
<td>1.31</td>
<td>0.34</td>
</tr>
<tr>
<td>Culture Neg</td>
<td>1.32</td>
<td>0.15</td>
<td>1.04</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>MULTIVARIATE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any Peritonitis</td>
<td>1</td>
<td>0.97</td>
<td>0.91</td>
<td>0.47</td>
</tr>
<tr>
<td>Any Gm+ve P</td>
<td>0.92</td>
<td>0.61</td>
<td>0.87</td>
<td>0.36</td>
</tr>
<tr>
<td>Coag Neg P</td>
<td>1.65</td>
<td>0.07</td>
<td>1.16</td>
<td>0.61</td>
</tr>
<tr>
<td>Culture Neg</td>
<td>1.2</td>
<td>0.36</td>
<td>0.99</td>
<td>0.97</td>
</tr>
</tbody>
</table>

- **7381 episodes over 9 yrs, 0.5 episodes/pt yr**
- **1330 episodes over 10 yrs, 0.6/pt yr**
- **No increased Exit site infections**

### Canadian Study


**AUSTRALIAN STUDY**


**CANADIAN STUDY**
IS OBESITY A FAVORABLE PROGNOSTIC FACTOR IN PERITONEAL DIALYSIS PATIENTS?

- AUST-NZ
- 1996-99
- A small study:
  - 50 patients
  - Only 3 yrs F/up

Obesity Is Associated with Worse Peritoneal Dialysis Outcomes in Australia and New Zealand

SP McDonald et al: JASN 2003;14:2894

>9400 pts, 1991-2002, 17% obese
Body size and outcomes on peritoneal dialysis in the United States 1995 to 2000: Retrospective PD cohort, Medicare-based

Relative risk of mortality

Relative risk of switch to HD
Adjusted Relative Mortality Risk by BMI quintiles for new ESRD: HD & PD

USRDS Historical prospective cohort >130,000 new ESRD pts. May 1995 thru July 1997

* p =<0.05, ** p =<0.01, *** p = <0.001
Reference BMI 23.6-26.1

Stack A et al: KI 2004; 65:2398-408
# Effect of Body size & Body composition on Mortality in PD patients

<table>
<thead>
<tr>
<th>Body composition Group</th>
<th>Hazard ratio</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal BMI (18.5-24.9 kg/m²) &amp; U. creat &gt;0.64 gm/day</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Normal BMI (18.5-24.9 kg/m²) &amp; U. creat ≤0.64 gm/day</td>
<td>1.25</td>
<td>1.14-1.39</td>
</tr>
<tr>
<td>High BMI (≥25 kg/m²) &amp; U.creat &gt;0.64 gm/day</td>
<td>0.90</td>
<td>0.83-0.97</td>
</tr>
<tr>
<td>High BMI (≥25 kg/m²) &amp; U.creat ≤0.64 gm/day</td>
<td>1.36</td>
<td>1.22-1.51</td>
</tr>
</tbody>
</table>

10,768 pts 1995 – 1999: Adjusted for age, race, gender, Medicare insurance, DM, CAD, CHF, CV Dz, PVD, Lung Dz, functional status, sAlb, & cancer


**Protective effect limited to those obese pts w. normal or high LBM**
Association between BMI & Mortality in PD: A Prospective Cohort Study from Korea

TABLE 5
Hazard Ratios for Mortality during PD Treatment According to BMI Category

<table>
<thead>
<tr>
<th>BMI (kg/m²)</th>
<th>HR</th>
<th>Crude 95% CI</th>
<th>p</th>
<th>HR</th>
<th>Adjusted 95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartile 1 (&lt;21.35)</td>
<td>2.86</td>
<td>1.33–6.12</td>
<td>0.007</td>
<td>3.00</td>
<td>1.26–7.15</td>
<td>0.01</td>
</tr>
<tr>
<td>Quartile 2 (21.35–23.47)</td>
<td>1 (reference)</td>
<td></td>
<td></td>
<td>1 (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quartile 3 (23.48–25.40)</td>
<td>1.32</td>
<td>0.56–3.14</td>
<td>0.53</td>
<td>1.11</td>
<td>0.43–2.85</td>
<td>0.83</td>
</tr>
<tr>
<td>Quartile 4 (&gt;25.40)</td>
<td>1.99</td>
<td>0.89–4.46</td>
<td>0.10</td>
<td>1.64</td>
<td>0.66–4.06</td>
<td>0.28</td>
</tr>
</tbody>
</table>

PD = peritoneal dialysis; BMI = body mass index; HR = hazard ratio; CI = confidence interval.
Hazard ratios are crude and adjusted for age, gender, diabetes and Davies comorbidity score.


900 pts, median F/up 24 mos
Effects of Excessive Body Fat Accumulation on Long-Term Outcomes During Peritoneal Dialysis

Prospective, 297 pts
Fat accumulation in 1 year: >5% men, 5.4% women

>15500 on PD & 28000 matched HD 2007-2011, Retrospective analysis

BMI:

- <20 5.5%
- 20-<25 26%
- 25-<30 32%
- 30-<35 21%
- 35-<40 10%
- >40 5.5%

Best survival

Hazard Ratio of 1

Obi Y et al. AJKD 2018; 71(6) 802-813
Higher incidence of peritonitis-related hospitalizations in higher BMI categories

Lower incidence of non-peritonitis-related hospitalizations
Obesity (BMI) & PD #3
Obi Y et al: AJKD; 2018;71(6) 802-813

Obese pts:
Faster decline in renal CCR

Greater increase in dKt/V

Faster decline in renal Kt/V

Total Kt/V remained more stable over time
Obesity (BMI) & PD - #4
Obi Y et al: AJKD; 2018;71(6)
802-813

SURVIVAL ADVANTAGE

BMI <25

BMI 25-<35

Attenuation of Survival Advantage in diabetics on PD compared to HD, in all 3 BMI categories

BMI ≥35
On HD, ↑ BMI renders a survival advantage.

In PD, ↑ BMI survival advantage, only if non-diabetic & BMI is <35, and if: LBM is normal or high. BMI 25 - <30: best survival

Underweight on dialysis is a mortality risk

Detecting Loss of LBM: Actual Body Wt or BMI or Target Body Wt

↑ BMI: ↑ peritonitis related hospitalizations & ↓ non-peritonitis related hospitalizations

Transfer to HD more common in ↑ BMI
Longer wait for Txp

↑ BMI: Faster loss of Renal Kt/V & Residual Renal Function
As anticipated, patients with Kt/V ≥ 1.7 by both measures had the lowest hospitalization rate.

Patients with Kt/V < 1.7 by both measures had the highest hospitalization rate.

 Patients with Kt/V^{Lean} ≥ 1.7 but Kt/V < 1.7 had a higher hospitalization rate than patients with Kt/V ≥ 1.7 by both measures.

Comparison represents the incidence rate ratio referent to Kt/V ≥ 1.7 by both measures (green). HUME FORMULA USED FOR LEAN BODY WT.

Hume formula does not take into account age; study sample only had 3 obese subjects.
What are the success rates for patients who undergo bariatric surgery?

**Retrospective cohort study**
- MedPAR: Medicare claims database
- Bariatric surgery recipients
- N=2698 ESKD
- N=201,104 non-ESKD
- 2006-2016

**Conclusions**
- Laparoscopic sleeve gastrectomy surgical procedure in patients with ESKD

Kyle H. Sheetz et al. CJASN

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### Patient Characteristics at Baseline

Initiated PD at between 01 January 2016 and 30 June 2018 (Davita)

<table>
<thead>
<tr>
<th></th>
<th>BMI ≤30</th>
<th>BMI &gt;30</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 10,693</td>
<td>N = 5750</td>
</tr>
<tr>
<td>Age, years, mean ± standard deviation</td>
<td>58.7 ± 16.2</td>
<td>57.0 ± 13.9</td>
</tr>
<tr>
<td><strong>Sex</strong>, female, %</td>
<td>41.7</td>
<td>44.1</td>
</tr>
<tr>
<td><strong>Race</strong>, black, %</td>
<td>19.3</td>
<td>24.6</td>
</tr>
<tr>
<td><strong>Diabetes</strong>, %</td>
<td>54.5</td>
<td>73.1</td>
</tr>
<tr>
<td><strong>BMI, kg/m², mean ± standard deviation</strong></td>
<td>24.7 ± 3.3</td>
<td>34.6 ± 3.4</td>
</tr>
<tr>
<td><strong>Total Kt/V</strong></td>
<td>2.4 ± 0.7</td>
<td>2.3 ± 0.7</td>
</tr>
<tr>
<td><strong>Total Kt/V &lt; 1.7, %</strong></td>
<td>13.9</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Associations Between Body Mass Index, Kt/V, and Outcomes among Patients Treated with Peritoneal Dialysis

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\(^2\)DaVita, Inc, Denver, CO

ASN, Washington DC 2019