2001年 6月
| 1. | CRP | 20 |
| 2. | leptin | 20 |
| 1. | (SGA) | 8 |
| 2. | | 10 |
| 3. | | 10 |
4. K, V, nPN, SCCr

5. µ, µ, µ, µ, µ, µ

6. µ, µ, µ, µ, µ

7. µ, µ, µ, µ, µ

8. µ, µ, µ, µ, µ

9. µ, µ, µ

10. µ, µ, µ, µ

11. µ, µ, µ, µ, µ

(µ, µ, µ, µ, µ)
1) 1:1 ± 9.4 67.3 ± 39.7 47% 34% 28% 75% 59.0% 30% 23.6% 22% 17.4%

2) SGA¹±ºº , I¹±ºº , III¹±ºº (p<0.01), I¹±ºº , III¹±ºº (p<0.05)

3) ¹±ºº , I¹±ºº , II¹±ºº (p<0.01), I¹±ºº , II¹±ºº , III¹±ºº (p<0.05).

4) , IGF-1, transferrin, leptin, prealbumin,
(p<0.01), CRP, ferritin, IL-6 (p<0.05), leptin, IGF-I, II, III, prealbumin, CRP, ferritin
(p<0.01).

5) Kt/Vurea, nPNA, SCCr (p<0.05).

6) Kt/Vurea, nPNA, SCCr (p<0.05).

7) Kt/Vurea, nPNA, SCCr (p<0.05).

8) SGA, leptin, CRP, IL-6 (Pearson's correlation) (r = 0.52), (r = 0.45), (r = 0.45), (r = 0.41),
leptin (r = 0.32), (r = -0.29), CRP (r = -0.24) (p<0.01).

9) SGA, leptin, CRP (r = 0.45), (r = 0.45), (r = 0.41), leptin (r = 0.32), (r = -0.29), CRP (r = -0.24)
(p<0.01).

40%
CRP, leptin, ñéçú, ïøòø-3-.
I.  A

(continuous ambulatory peritoneal dialysis, CAPD, 1-7). Young 2 33% 8% 1-7). Young 2 8% 1-7). Young 2 8%
6,8,9) 1) 2) 3) 4) 5) 6) 7) 8) 9) 10) 1,10).
CAPD 11-15) 2,11-15) 2,11-15) 2,11-15)
prealbumin, insulin like growth factor-1 (IGF-1), CRP, C-reactive protein (CRP),
(normalized protein equivalence of nitrogen appearance, nPNA), anthropometry, SGA
(anthropometry), (SGA), calculated arm muscle area, CAMA
(calculated arm muscle area, CAMA), IGF-1, CRP,
Qureshi.
・ ロケーション情報
  住所：〒100-0001 東京都中央区
  電話：03-1234-5678
  電葉：03-1234-5678
  時間：10:00～18:00
  駐車場：有り

・ メニュー
  1. メインディッシュ
  2. ソース
  3. スナック

・ 営業日
  1. 月曜日
  2. 火曜日
  3. 水曜日

・ 休業日
  1. 土曜日
  2. 日曜日
II. 

1. 

1986年 12月 1999年 3月 7月

2. 

§. § (SGA)
1. History

1) Weight loss
   overall loss in the past 6 months #___Kg, #___%loss
   change in past 2 weeks  increase, no change, decrease
2) Dietary intake change
   no change___
   change # duration___months
   # type suboptimal solid diet, full liquid diet, hypocaloric diet, starvation
3) Gastrointestinal Sx (persist for 2 weeks)
   none, nausea, vomiting, diarrhea, anorexia
4) Functional capacity
   no dysfunction
   dysfunction # duration___months
   # type suboptimal working, ambulatory, bedridden
5) Disease and its relation to nutritional requirements
   primary Dx
   metabolic demand  no stress, low stress, moderate stress, high stress

2. Physical examination

(0=normal, 1=mild, 2=moderate, 3=severe)
# loss of subcutaneous fat___
# muscle wasting___
# ankle edema___
# sacral edema___
# ascites___

3. SGA scoring system

Group I : 6-7 normal nutritional status
Group II : 5 mild malnutrition
Group III : 4 moderate malnutrition
   1-3 severe malnutrition

Lange caliper[ ]
(triceps),
(biceps),
(subscapular),
(suprailiac) 4

(skinfold thickness)
mid arm circumference, MAC
triceps skinfold thickness, TSF

CAMA = MAC - (π * TSF)

TBM = Height * (0.0264 + 0.0029 * CAMA)

Hand grip strength, HGS
Back lift strength, BLS

Harpden dynamometer

Lean body mass, LBM

(TBF - 105, Tanita, Japan)

30° (50kHz)
1mA

Keshaviah
2. In the steady state

Production = excretion + metabolic degradation

Excretion (mg/day) = VuCu + VdCd

Metabolic degradation (mg/day)

in normals = 0.418 * body weight (kg)
in patients = 0.38 * Scr (mg/day) * body weight (kg)

LBM (kg) = 0.029 * production (mg/day) + 7.38

Vu: volume of urine (mL/24 hr)
Vd: volume of effluent dialysate (mL/24 hr)
Cu: creatinine concentration in urine (mg/mL)
Cd: creatinine concentration in effluent dialysate (mg/mL)
Scr: serum creatinine (mg/dL)

3. Skinfold thickness by Lange caliper

Body density (D) calculation by age and sex adjusted equations

(Durin & Womersley, 1974)

Equation for men:

Age range

17-19 D = 1.1620 - 0.0630 * log (sum of four skinfold thickness)
20-29 D = 1.1631 - 0.0632 * log (sum of four skinfold thickness)
30-39 D = 1.1422 - 0.0544 * log (sum of four skinfold thickness)
40-49 D = 1.1620 - 0.0700 * log (sum of four skinfold thickness)
50- D = 1.1715 - 0.0779 * log (sum of four skinfold thickness)

Equation for women:

Age range

17-19 D = 1.1549 - 0.0678 * log (sum of four skinfold thickness)
20-29 D = 1.1599 - 0.0717 * log (sum of four skinfold thickness)
30-39 D = 1.1423 - 0.0632 * log (sum of four skinfold thickness)
40-49 D = 1.1333 - 0.0612 * log (sum of four skinfold thickness)
50- D = 1.1339 - 0.0645 * log (sum of four skinfold thickness)

Percentage body fat calculation by Siri's equation (Siri, 1961)

men: %fat = (4.95/density - 4.50) * 100
women: %fat = (5.033/density - 4.592) * 100

LBM = fat-free mass = BW - (BW * %body fat)
CRP, IL-6, TNF-α, albumin, prealbumin, leptin, IGF-1.

Table 1: RRF (residual renal function, ml/min)

<table>
<thead>
<tr>
<th>RRF = [(Ucr/Scr + Uurea/Surea) * Uvol] / 1440 * 2</th>
</tr>
</thead>
</table>

2. Weekly Kt/Vurea = [(Dun + Uun) / V] * 7

K: urea clearance, T: treatment time
V: total body water

24-hour urine urea excretion rate

weekly Kt/Vurea

Watson normogram

nPNA

Randerson

urea generation rate

Table 2: nPNA (g/kg/day)

nPNA = PNA / standard weight

PNA (g/day) = 10.76 * (Gun + 1.46)

Gun = (Dvol * Durea + Uvol * Uurea) / 1440

Standard weight = V / 0.58

4. Scc (standardized creatinine clearance, l/week/1.73m²)

Scc = [(Dvol * Dcr) / Scr + (Uvol * Ucr) / Scr] * 7 * 1.73 / BSA
Ucr: urine creatinine concentration (mg/dl)
Sc: serum creatinine concentration (mg/dl)
Uurea: urine urea nitrogen concentration (mg/dl)
Durea: dialysate urea nitrogen concentration (mg/dl)
Uvol: urine volume/day (liter)
Dvol: drained dialysate volume/day (liter)
Gun: urea generation rate (mg/min), BSA: body surface area

3. METHOD

SPSS, Version 10.0, ± standard deviation, (SGA) (standard peritoneal equilibration test, PET) (high, high average, low average, low) (simple linear regression analysis) (ANOVA) (multiple regression analysis) (Pearson's correlation)
III. Ⅰ

1. Ⅰ・Ⅱ・Ⅲ

<table>
<thead>
<tr>
<th>Ⅰ</th>
<th>Ⅱ</th>
<th>Ⅲ</th>
</tr>
</thead>
<tbody>
<tr>
<td>127 ± 62</td>
<td>65 ± 59.7</td>
<td>67.8 ± 39.7</td>
</tr>
<tr>
<td>47 (37.0%)</td>
<td>40 (31.5%)</td>
<td>28 (22.0%)</td>
</tr>
<tr>
<td>40</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

2. SGA

SGA: Ⅰ ± Ⅱ ± Ⅲ (p < 0.01)
### 5. 

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of subjects</td>
<td>75 (59.0%)</td>
<td>30 (23.6%)</td>
<td>22 (17.4%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>48.0 ± 11.5</td>
<td>50.3 ± 11.2</td>
<td>50.7 ± 11.4</td>
</tr>
<tr>
<td>Sex (male/female)</td>
<td>30/45</td>
<td>20/10</td>
<td>12/10</td>
</tr>
<tr>
<td>Duration of CAPD (months)</td>
<td>61.2 ± 34.8</td>
<td>70.5 ± 43.5</td>
<td>86.6 ± 9.6</td>
</tr>
<tr>
<td>Incidence of peritonitis (episode/patient/year)</td>
<td>0.7 ± 1.6</td>
<td>1.0 ± 1.4</td>
<td>1.8 ± 2.2</td>
</tr>
<tr>
<td>Hospitalization (days/year)</td>
<td>3.9 ± 8.8</td>
<td>4.5 ± 8.4</td>
<td>21.3 ± 26.6</td>
</tr>
<tr>
<td>Comorbid condition</td>
<td>20 (26.7%)</td>
<td>7 (23.3%)</td>
<td>8 (36.4%)</td>
</tr>
</tbody>
</table>

**PET (peritoneal equilibration test)**

- low: 9 (12.0%) 1 (3.4%) 2 (9.0%)
- low average: 31 (41.3%) 9 (31.0%) 7 (31.8%)
- high average: 23 (30.6%) 13 (44.8%) 8 (36.3%)
- high: 12 (16.0%) 6 (20.6%) 5 (22.7%)

\[ p < 0.05 \text{ compared with group I} \]
\[ p < 0.05 \text{ compared with group II} \]

3. 

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
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<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low (p &lt; 0.005)</td>
<td>low average (p &lt; 0.001)</td>
<td>high average (p &lt; 0.001)</td>
</tr>
<tr>
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<td>high (p &lt; 0.005)</td>
<td>high average (p &lt; 0.001)</td>
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<td>high average (p &lt; 0.001)</td>
<td>high average (p &lt; 0.001)</td>
</tr>
<tr>
<td></td>
<td>Group I</td>
<td>Group II</td>
<td>Group III</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Hemoglobin (g/dL)</td>
<td>9.7±1.6</td>
<td>9.4±2.2</td>
<td>8.9±1.8</td>
</tr>
<tr>
<td>Total lymphocyte (10⁹/L)</td>
<td>4.7±2.7</td>
<td>3.5±2.9</td>
<td>3.6±2.7</td>
</tr>
<tr>
<td>BUN (mg/dl)</td>
<td>54.6±14.2</td>
<td>57.2±17.3</td>
<td>48.3±15.4</td>
</tr>
<tr>
<td>Cr (mg/dl)</td>
<td>11.3±3.1</td>
<td>10.7±2.0</td>
<td>8.9±1.9</td>
</tr>
<tr>
<td>Phosphate (mg/dl)</td>
<td>5.2±1.4</td>
<td>4.9±1.1</td>
<td>4.4±1.5</td>
</tr>
<tr>
<td>Uric acid (mg/dl)</td>
<td>6.7±1.2</td>
<td>6.5±1.0</td>
<td>6.3±1.3</td>
</tr>
<tr>
<td>Total cholesterol (mg/dl)</td>
<td>198.9±35</td>
<td>203.2±37.3</td>
<td>190.3±29.7</td>
</tr>
<tr>
<td>Triglyceride (mg/dl)</td>
<td>197.5±146.3</td>
<td>131.5±74.8'</td>
<td>104.7±37.1'</td>
</tr>
<tr>
<td>Lp(a) (mg/dl)</td>
<td>31.6±19.7</td>
<td>41.8±28.9</td>
<td>34.6±33.1</td>
</tr>
<tr>
<td>Total protein (g/dl)</td>
<td>6.7±0.6</td>
<td>6.5±0.7</td>
<td>6.3±0.7</td>
</tr>
<tr>
<td>Albumin (g/dl)</td>
<td>3.8±0.4</td>
<td>3.5±0.4'</td>
<td>3.2±0.4''</td>
</tr>
<tr>
<td>Prealbumin (mg/dl)</td>
<td>48.4±13.7</td>
<td>45.7±11.6</td>
<td>37.8±13.9'</td>
</tr>
<tr>
<td>IGF-1 (ng/ml)</td>
<td>221.1±105.3</td>
<td>213.4±137.8</td>
<td>126.8±88.9''</td>
</tr>
<tr>
<td>Transferrin (mg/dl)</td>
<td>179.5±29.2</td>
<td>169.7±30.4</td>
<td>153.1±30.6'</td>
</tr>
<tr>
<td>CRP (mg/dl)</td>
<td>0.35±0.2</td>
<td>0.56±0.5</td>
<td>1.91±3.9''</td>
</tr>
<tr>
<td>Leptin (ng/ml)</td>
<td>25.7±30.2</td>
<td>10.6±15.5''</td>
<td>5.2±5.3'</td>
</tr>
<tr>
<td>Insulin (mU/l)</td>
<td>12.1±11.7</td>
<td>10.3±10.8</td>
<td>7.9±5.1'</td>
</tr>
<tr>
<td>TNF-α (pg/ml)</td>
<td>68.8±49.3</td>
<td>68.4±64.5</td>
<td>82.9±56.9</td>
</tr>
<tr>
<td>Interleukin-6 (pg/ml)</td>
<td>31.3±46.1</td>
<td>25.1±40.8</td>
<td>88.4±167.7'</td>
</tr>
<tr>
<td>Ferritin (ng/ml)</td>
<td>281.1±215.3</td>
<td>310.8±285.1</td>
<td>699.7±896.4''</td>
</tr>
</tbody>
</table>

* : p < 0.05 compared with group I  
** : p < 0.05 compared with group II
<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRF (ml/ min)</td>
<td>0.80 ± 1.3</td>
<td>0.49 ± 0.9</td>
<td>0.13 ± 0.4</td>
</tr>
<tr>
<td>Kt/Vurea</td>
<td>2.14 ± 0.5</td>
<td>2.04 ± 0.3</td>
<td>2.12 ± 0.4</td>
</tr>
<tr>
<td>SCCr (/wk/ 1.73m²)</td>
<td>67.6 ± 16.9</td>
<td>67.6 ± 10.1</td>
<td>67.7 ± 15.0</td>
</tr>
<tr>
<td>PNA (g/day)</td>
<td>55.1 ± 10.9</td>
<td>55.6 ± 12.4</td>
<td>48.9 ± 12.7</td>
</tr>
<tr>
<td>nPNA (g/body weight/day)</td>
<td>0.99 ± 0.2</td>
<td>0.99 ± 0.2</td>
<td>0.93 ± 0.2</td>
</tr>
</tbody>
</table>

* : p < 0.05 compared with group I

* : p < 0.05 compared with group II

5. ด้วยการวิเคราะห์ Statistic วิเคราะห์การกระจายของผลลัพธ์ (ผู้ 8)

MAC, TSF, BSF, CAMA, TBM ต่อ 1, 2, 3 กลุ่ม ต่างกัน (p<0.01), ที่ 2, 3 กลุ่ม มากกว่า 1 กลุ่ม โดยที่ 2, 3 กลุ่ม มากกว่า 1 กลุ่ม 72 วัน 72 วัน 72 วัน 72 วัน 72 วัน 72 วัน 72 วัน 72 วัน.
### Table 8. Anthropometric Measurements

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>158.7±9.2</td>
<td>162.6±7.9</td>
<td>160.9±8.7</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>61.4±8.8</td>
<td>57.0±7.4</td>
<td>52.4±7.6</td>
</tr>
<tr>
<td>% IBW</td>
<td>112.5±13.3</td>
<td>99.3±11.7</td>
<td>92.6±8.3</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.5±3.3</td>
<td>21.6±2.4</td>
<td>20.4±1.9</td>
</tr>
<tr>
<td>% Body fat mass</td>
<td>21.7±8.9</td>
<td>14.5±6.9</td>
<td>14.8±6.6</td>
</tr>
<tr>
<td>MAC (cm)</td>
<td>27.4±2.8</td>
<td>24.7±2.1</td>
<td>22.9±2.3</td>
</tr>
<tr>
<td>TSF (mm)</td>
<td>13.2±5.5</td>
<td>9.3±3.9</td>
<td>7.3±2.4</td>
</tr>
<tr>
<td>BSF (mm)</td>
<td>9.9±5.5</td>
<td>6.5±3.2</td>
<td>5.6±2.3</td>
</tr>
<tr>
<td>MAC (cm²)</td>
<td>35.4±8.9</td>
<td>28.6±7.0</td>
<td>25.0±7.3</td>
</tr>
<tr>
<td>TBM (kg)</td>
<td>20.5±4.3</td>
<td>17.5±3.4</td>
<td>16.0±4.0</td>
</tr>
<tr>
<td>HGS (kg)</td>
<td>25.1±9.6</td>
<td>24.9±9.4</td>
<td>22.0±7.1</td>
</tr>
<tr>
<td>BLS (kg)</td>
<td>70.4±36.3</td>
<td>64.0±21.6</td>
<td>53.3±25.2</td>
</tr>
<tr>
<td>Total calorie intake (kcal/kg/day)</td>
<td>20.8±4.6</td>
<td>24.3±2.1</td>
<td>21.9±4.2</td>
</tr>
<tr>
<td>Protein intake (g/kg/day)</td>
<td>1.0±0.2</td>
<td>0.9±0.2</td>
<td>0.9±0.1</td>
</tr>
<tr>
<td>Fat intake (g/day)</td>
<td>36.6±15.4</td>
<td>39.2±17.8</td>
<td>39.2±14.4</td>
</tr>
</tbody>
</table>

* : \( p < 0.05 \) compared with group I  
** : \( p < 0.05 \) compared with group II

### 6. Lean Body Mass (LBM) (9)

The LBM consists of (LBMc) and (LBMcr) for groups I, II, and III. It is calculated as (LBMc) for groups I, II, and III, and (LBMcr) for groups I and II. The LBManthro was significantly lower in group III compared to group I \((p<0.01)\). However, the difference between LBMcr and (LBMc) for group II was not significant \((p<0.05)\). The average LBMcr for group III was 14.8±6.0 kg, which is significantly lower than that of group I. 

- 17 -
9. 胃肠外营养

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBMc, kg</td>
<td>44.2±9.9</td>
<td>39.5±7.9</td>
<td>28.9±6.7&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>LBManthro, kg</td>
<td>44.9±8.9</td>
<td>44.4±7.0</td>
<td>43.7±12.6</td>
</tr>
<tr>
<td>LBMimp, kg</td>
<td>48.2±10.3</td>
<td>47.5±8.6</td>
<td>43.7±12.1</td>
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</table>

<sup>a</sup>: *p < 0.05 compared with group I

<sup>b</sup>: *p < 0.05 compared with group II

7. 食物摄入量

SGA<sup>a</sup> 胃肠外营养支持下病人血清营养素水平比较（Pearson's correlation）

- LBMc, prealbumin, IGF-1, leptin, TSF, CAMA, CRP, ferritin, IL-6
- LBMc, leptin, TSF, CAMA, CRP, ferritin, IL-6
- LBMc, CRP, ferritin, IL-6

(\( \gamma = 0.45 \), \( \gamma = 0.52 \), \( \gamma = 0.32 \), \( \gamma = 0.45 \), \( \gamma = 0.41 \), \( \gamma = -0.29 \)

CRP (\( \gamma = -0.24 \)) SGA<sup>a</sup> 胃肠外营养支持下病人血清营养素水平比较（Pearson's correlation）

- LBMc, CAMA, CRP, IL-6
- CRP, IL-6

SGA<sup>a</sup> 胃肠外营养支持下病人血清营养素水平比较（Pearson's correlation）

- TSF, CAMA, CRP, IL-6

\( p < 0.01 \), leptin \( p < 0.01 \), CRP (\( p < 0.05 \))
CRP  (γ = -0.34) (1), leptin  (γ =0.29) (2), leptin  CRP  (γ = -0.06).

<table>
<thead>
<tr>
<th><em>SGA</em></th>
<th><em>Age</em></th>
<th><em>Cr</em></th>
<th><em>TG</em></th>
<th><em>Alb</em></th>
<th><em>Prealb</em></th>
<th><em>IGF-I</em></th>
<th><em>CRP</em></th>
<th><em>Leptin</em></th>
<th><em>IL-6</em></th>
<th><em>Ferritin</em></th>
<th><em>%IBW</em></th>
<th><em>LBMcr</em></th>
<th><em>RRF</em></th>
<th><em>nPNA</em></th>
<th><em>TSF</em></th>
<th><em>CAMA</em></th>
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<tr>
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<td>0.31</td>
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<td>0.71</td>
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<td>-0.29</td>
<td>0.38</td>
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(* : p<0.05)

<table>
<thead>
<tr>
<th><em>coefficient</em></th>
<th><em>p-value</em></th>
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<tr>
<td>Albumin</td>
<td>0.896</td>
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<tr>
<td>Leptin</td>
<td>8.14E-03</td>
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<td>CRP</td>
<td>-0.118</td>
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</table>
\( \gamma = 0.34 \)

\( \gamma = 0.29 \)
IV.

Continuous Ambulatory Peritoneal Dialysis (CAPD) [1, 2]

17 - 56% [3, 4, 5, 6] of patients may experience a decrease in weight of 1 - 7% [7, 8, 9].

Bannister [10, 11, 12] reported a decrease in weight of 52% (41%) in 127 patients, with 52% (41%) of patients gaining weight. In a study by SGA [13, 14, 15], a decrease in weight of 22% (17.4%) was observed in 22 patients, with an increase in weight of 8% (6.3%) in 30 patients (23.6%).

- 21 -
high transporter low transporter
(18), high average high transporter
(18), high average high transporter
Szeto 37, Kang 38, 147
composite nutritional index (CNI)
Transferrin, prealbumin
(albumin 19-20, transferrin 8-9, prealbumin 2-3)
IGF-1, transferrin, prealbumin
CRP, ferritin, IL-6
%IBW, LBMcr, CAMA, HGS
CRP, ferritin, IL-6
35,39. 72
0.9-1.0 g/kg/day
1.2-1.3 g/kg/day
20-25 kcal/kg/day
35 kcal/kg/day

Kt/Vurea, SCC

Kt/Vurea, nPNA, LBMc

(1996, Peritoneal Dialysis Core Indicator Study)

Lopez-Menchero

nPNA

CRP, ferritin, IL-6, TNF-α
Á¦Áö¹æ¹«°Ô (LBM)

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º»¿¬±¸¿¡¼­¿µ¾ç»óÅ Â÷À̴¸»±â½ÅºÎÀüȯÀÚ¿¡¼­µµ¿µ¾ç»óÅÂÀÇÁöÇ¥·Î

CAMA , T SF , H GS ¿ÍÀÌÀå±â°£¿¡°ÉÄ£´Ü¹éÁú-

À»ÃøÁ¤ÇÏ¿©¿µ¾ç»óŸ¦Æò°¡¿¡À¯¿ëÇѰÍÀ¸·Î¾Ë·ÁÁ®Àִµ¥¿©·¯°¡Áö¹æ¹ýÁß

DEXA (dual energy x-ray absorptiometry)

- 24 -
leptin, CRP\cite{51,52,53}, leptin\cite{54}, leptin\cite{55}, leptin\cite{56}, PNA\cite{57}.\cite{51,52,53}, Burl\cite{54}, Johansen\cite{55}, PNA\cite{57}.
V. 市場の変化

127件のデータから、SGAグループの41%（23.6%）は、17.3%（17.3%）のデータから、 leptin, CRP と

leptin と CRP の関係を示す。 leptin の関係を示す。
11. Lowrie EG, Lew NL. Death risk in hemodialysis patients: The predictive value of commonly measured variables and an evaluation of death rate differences between facilities. Am J Kidney Dis


48. Harty JC, Boulton H, Curwell J, Heelis N, Uttley L, Venning MC. The normalized protein catabolic rate is a flawed marker of nutrition in continuous ambulatory peritoneal dialysis patients.


- 32 -
Abstract

Factors Affecting Malnutrition in Continuous Ambulatory Peritoneal Dialysis Patients: A Cross-sectional Study

Ea Wha Kang

Department of Internal Medicine
The Graduate School, Yonsei University

(Directed by Professor Dae Suk Han)

Protein-calorie malnutrition is common in continuous ambulatory peritoneal dialysis (CAPD) patients and is associated with an increase in morbidity and mortality. There have been many studies to evaluate various factors associated with malnutrition in CAPD patients and to improve their nutritional status. This cross-sectional study was carried out to investigate prevalence of protein-calorie malnutrition in Korean CAPD patients. Other purposes were to ascertain relationship between various nutritional parameters and to evaluate factors independently associated with malnutrition in CAPD patients. Subjects were clinically stable 127 patients who have been on CAPD for more than 3 months. Nutritional status was assessed by subjective global assessment (SGA), biochemical, anthropometric, and urea kinetic parameters. The results were as follows:

1) The mean age of the patients was 50.7 ± 11.4 years with sex ratio (M: F) 1:1, and mean duration of dialysis was 67.3 ± 39.7 months.
2) Patients were divided into 3 groups according to SGA: group I (normal nutrition, n=75, 59.0%), group II (mild malnutrition, n=30, 23.6%) and group III (moderate to severe malnutrition, n=22, 17.4%).
3) There were significant differences in age, CAPD duration,
peritonitis rate and hospital-days per year between group I and group III. And, there were also significant differences in peritonitis rate and hospital-days per year between group II and group III. However, there were no differences in sex ratio, cause of renal failure, comorbid conditions, and peritoneal equilibration test among the three groups.

4) Among biochemical variables, serum creatinine, triglyceride, protein, albumin, prealbumin, IGF-1, transferrin and leptin were significantly lower in group III compared to group I (p<0.05), and CRP, ferritin, and IL-6 were significantly higher in group III than group I. There were significant differences in serum albumin among all three groups.

5) There were no differences in Kt/Vurea, nPNA and SCCr among three groups. However, there were significant differences in residual renal function (p<0.05) and PNA (p<0.05) between group I and group III.

6) Among anthropometric variables, body weight, %IBW, BMI, %body fat mass, MAC, TSF, BSF, CAMA, and TBM were significantly lower in group III than the other two groups (p<0.05). But, there was no differences in exercise capacity and food intake among the three groups.

7) Lean body mass by creatinine kinetics was significantly lower in group III than the other two groups. But, there was no differences in lean body mass estimated by anthropometric and impedance methods among the three groups.

8) To evaluate relationship between various parameters used for assessing malnutrition, we conducted Pearson's rank correlation test. Serum albumin (γ =0.45), age (γ =-0.29), %IBW (γ =0.52), leptin (γ =0.32), CRP (γ =-0.24), TSF (γ =0.45) and CAMA (γ =0.41) significantly correlated with SGA.

9) As a result of multiple regression analysis, albumin, leptin, and CRP were independent predictors of malnutrition (p<0.05). There was a positive correlation between albumin and leptin (γ =0.29, p<0.01), and there was a negative correlation between albumin and CRP (γ =-0.34, p<0.01).
In conclusion, about 40% of CAPD patients were malnourished according to SGA, and multiple regression analysis revealed that serum albumin, leptin and CRP were independent predictors of malnutrition. These results suggest that acute and chronic inflammatory response plays an important role in the development of protein-calorie malnutrition in CAPD patients with comparable food intake and dialysis dose.

**Key words**: continuous ambulatory peritoneal dialysis, subjective nutritional assessment, malnutrition, inflammatory response.