

**BASELINE CHARACTERICTICS**

**Table 1. Baseline Demographics, Body Composition, Laboratory and Physical Function Characteristics of the Study Population**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Patients Characteristics | TOTAL  (n=38) | ONS  (n=19) | ONS + EX  (n=19) | *p* |
| Age (años) | 33 ± 10.8 | 35 ± 11.47 | 32 ± 10.26 | **0.464** |
| Sex (n/%) |  |  |  |  |
| Male | 20 (52.6) | 9 (47.4) | 11 (57.9) |  |
| Etiology (n/%) | | | | **0.609** |
| Unknow | 27 (71.1) | 14 (73.7) | 13 (68.4) |  |
| Diabetes mellitus | 3 (7.9) | 2 (10.5) | 1 (5.3) |  |
| Glomerulopathy | 1 (2.6) | 1 (5.3) | 0 (0) |  |
| Hypertension | 4 (10.5) | 1 (5.3) | 3 (15.8) |  |
| Other | 3 (7.9) | 1 (5.3) | 2 (10.5) |  |
| Frequency of dialysis (n/%) |  |  |  | **0.670** |
| 2 times per week | 32 (84.2) | 16 (84.2) | 16 (84.2) |  |
| 3 times per week | 6 (15.8) | 3 (15.8) | 3 (15.8) |  |
| Dialysis vintage (years) | 2 (1,3.2) | 3 (1,6) | 3 (1,5.5) | ***0.168*** |
| Uresis (ml) | 85 ± 26 | 81.5 ± 30. | 89.4 ± 43 | ***0.882*** |
| Comorbidities (n/%) | | | | |
| Diabetes | 2 (7.9) | 2 (10.5) | 1 (5.3) | ***0.500*** |
| Hypertension | 38 (100) | 19 (100) | 19 (100) | ***NS*** |
| Charlson comorbidity index | 2.3 ± .12 | 2.5 ± .22 | 2.1 ± .08 | ***0.134*** |
| Vascular access (n/%) | | | | ***0.628*** |
| Catheter | 16 (42.1) | 11 (57.9) | 11 (57.9) |  |
| AV fistula | 22 (57.9) | 8 (42.1) | 8 (42.1) |  |
| Weight (kg) | 56.6 ± 8.2 | 56.57 ± 7.4 | 56.6 ± 9.1 | ***0.976*** |
| Body mass index (kg/m2) | 21.9 ± 2.9 | 22.19 ± 2.8 | 21.6 ± 3.1 | ***0.560*** |
| Midarm circumference (cm) | 27.4 ± 3.0 | 27.7 ± 2.8 | 27 ± 3.3 | ***0.528*** |
| Arm muscle circumference (mm) | 246.30 ± 64.7 | 263.3 ± 26.85 | 229.3 ± 85.3 | ***0.112*** |
| Arm muscle area (cm2) | 35 ± 14.65 | 39.1 ± 10.6 | 30.8 ± 17.1 | ***0.081*** |
| Fat mass % (Anthropometry) | 20.4 ± 8.2 | 21.32 ± 8.9 | 19.5 ± 7.5 | ***0.517*** |
| Triceps skinfold thickness (mm) | 11.8 ± 5.3 | 11.8 ± 5.0 | 11.7 ± 5.6 | ***0.920*** |
| MIS (score) | 5.1 ± 2.7 | 5.6 ± 2.7 | 4.3 ± 2.7 | ***0.275*** |
| Resistance (ohm) | 569.5 ± 106 | 568.4 ± 99 | 570.6 ± 116 | ***0.950*** |
| Reactance (ohm) | 57.3 ± 13 | 55.5 ± 13 | 59.1 ± 12 | ***0.411*** |
| Phase angle (°) | 5.7 ± .86 | 5.5 ± .90 | 5.9 ± .80 | ***0.216*** |
| Hemoglobin (g/dl) | 10.19 ± 2.1 | 9.9 ± 1.6 | 10.4 ± 2.5 | ***0.445*** |
| Total lymphocytes count (cel/mm3) | 1137 ± 305 | 1127 ± 318 | 1148 ± 299 | ***0.839*** |
| Creatinine (mg/dl) | 13 ± 4.1 | 13.6 ± 3.4 | 12.4 ± 4.8 | ***0.411*** |
| Albumin (g/dL) | 4.2 ± .43 | 4.2 ± .40 | 4.2 ± .47 | ***0.738*** |
| Phosphorus (mg/dl) | 5.7 ± 2.3 | 5.8 ± 2.1 | 5.5 ± 2.4 | ***0.720*** |
| Potassium (mmol/L) | 5.4 ± .99 | 5.6 ± .87 | 5.3 ± 1.1 | ***0.413*** |
| CRP (mg/L) | 11.7 ± 20.6 | 8.9 ± 14.1 | 14.4 ± 25.6 | ***0.421*** |
| Six-minute walk (m) | 408 ± 64.1 | 409 ± 64.4 | 407 ± 64.5 | ***0.935*** |
| Gait speed (m/s) | 0.86 ± 0.1 | 0.86 ± 0.1 | 0.86 ± 0.14 | ***0.937*** |
| Time Up and Go (s) | 8.2 ± 1.5 | 8.5 ± 1.7 | 7.9 ± 1.2 | ***0.184*** |
| 5t-sit to stand (s) | 9.4 ± 2.7 | 10.5 ± 2.9 | 8.3 ± 2.0 | ***0.011*** |
| Short Physical Performance Battery (score) | 10.8 ± 1.3 | 10.7 ± 1.4 | 10.9 ± 1.12 | ***0.626*** |
| Handgrip strength (kg) | 24.7 ± 9.3 | 25.5 ± 8.6 | 23.9 ± 10.1 | ***0.928*** |
| Physical activity (kcal from PAQ) | 2398 ± 725 | 2510 ± 786 | 2286 ± 661 | ***0.347*** |

Data are indicated as absolute number (percentage), mean ± standard deviation, or median (first and third quartiles). Fat mass is presented as a percentage of body weight from anthropometry. AV, arteriovenous; CRP, C-reactive protein; ONS, oral nutritional supplementation.

**OUTCOME MEASURES**

**Table 2. Changes in Body Composition Measured by Anthropometrics**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Body Composition  Characteristics | ONS  (n=14) | | | | | | ONS + EXERCISE  (n=10) | | | | | | *P+* | *P++* |
|  | **Baseline**  **(n=17)** | **3 months**  **(n=17)** | ***p\**** | **Baseline**  **(n=14)** | **6 months**  **(n=14)** | ***p\**** | **Baseline**  **(n=12)** | **3 months**  **(n=12)** | ***p\**** | **Baseline**  **(n=10)** | **6 months**  **(n=10)** | ***p\**** |
| Weight (kg) | 55.7 ± 7.3 | 56.3 ± 7.1 | ***0.027*** | 54.7 ± 7.4 | 55.8 ± 6.7 | ***0.014*** | 56.5 ± 9.2 | 58 ± 8.7 | ***0.010*** | *56.2* ± 8.8 | 58.2 ± 9.2 | ***0.001*** | ***0.585*** | **0.462** |
| Midarm circumference (cm) | 27 ± 2.8 | 27 ± 2.9 | ***0.169*** | 27 ± 3.1 | 26.5 ± 3 | ***0.151*** | 27 ± 3.3 | 26.8 ± 3.1 | ***0.782*** | *27.1* ± 3.5 | 27 ± 3.1 | ***0.778*** | ***0.977*** | ***0.770*** |
| Arm muscle circumference (mm) | 237 ± 25 | 230 ± 27 | ***0.092*** | 232.6 ± 23 | 224 ± 24 | ***0.110*** | 232.6 ± 26 | 228 ± 24 | **0.436** | *230* ± 27 | 226 ± 25 | ***0.539*** | ***0.493*** | ***0.842*** |
| Arm muscle area (cm2) | 38.8 ± 9.8 | 36 ± 10 | ***0.087*** | 37 ± 8.8 | 33.9± 9.1 | ***0.097*** | 37 ± 9.5 | 35.5 ± 8.8 | **0.434** | 36 ± 9.8 | 34 ± 9.2 | ***0.544*** | ***0.475*** | **0.838** |
| Fat mass (%) | 22.4 ± 8.7 | 23 ± 8.8 | ***0.102*** | 23.3 ± 8.2 | 23.8 ± 8.2 | ***0.311*** | 19.5 ± 7.1 | 20.5 ± 7.1 | ***0.011*** | 21 ± 7 | 22.9 ± 7.9 | ***0.046*** | ***0.458*** | ***0.793*** |
| Triceps skinfold thickness (mm) | 12.6 ± 4.7 | 13 ± 5.2 | ***0.333*** | 12.8 ± 4.6 | 13.1 ± 5.2 | ***0.537*** | 11.7 ± 5.4 | 12.5 ± 6 | ***0.075*** | 13 ± 5.1 | 13.7 ± 5.2 | ***0.066*** | ***0.879*** | ***0.798*** |
| MIS (score) | 5.7 ± 2.9 | 5.7 ± 2.5 | ***0.728*** | 6 ± 3 | 5.1 ± 2.6 | ***0.075*** | 5.3 ± 3.1 | 4.1 ± 2.3 | ***0.023*** | ***5*** ± 3 | 4 ± 2.9 | ***0.085*** | ***0.096*** | ***0.328*** |

Anthropometric indicators are represented as mean ± standard deviations. Fat mass presented as percentage of body weight was measured with anthropometry. ONS, oral nutritional supplementation.

-p\*: Student´s t-test for intragroup comparison

-p+: Student´s t-test for comparison between groups (Measurements at 3 months)

-p++: Student´s t-test for comparison between groups (Measurements at 6 months)

**Table 3. Changes in Body Composition Measured by Bioelectric Impedance Analysis**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | ONS  (n=14) | | | ONS + EXERCISE  (n=10) | | | *P++* |
|  | **Baseline** | **6 months** | ***p\**** | **Baseline** | **6 months** | ***p\**** |
| Resistance (ohms) | 593± 96 | 599± 118 | ***0.750*** | 631 ± 109 | 622 ± 109 | ***0.586*** | **0.763** |
| Reactance (ohms) | 57±12 | 59±21 | ***0.651*** | 64.5 ± 14 | 60.8 ± 13 | ***0.443*** | ***0.326*** |
| Phase angle° | 5.5±.98 | 5.5±1.5 | ***0.896*** | 5.8 ± .68 | 5.5 ± 1.1 | ***0.515*** | ***0.534*** |

ONS, oral nutritional supplementation.

-p\*: Student´s t-test for intragroup comparison

-p++: Student´s t-test for comparison between groups (Measurements at 6 months)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Physical Function Tests | ONS  (n=14) | | | | | | CON + EXERCISE  (n=10) | | | | | | *P+* | *P++* |
| **Baseline**  **(n=17)** | **3 months**  **(n=17)** | ***p\**** | **Baseline**  **(n=14)** | **6 months**  **(n=14)** | ***p\**** | **Baseline**  **(n=12)** | **3 months**  **(n=12)** | ***p\**** | **Baseline**  **(n=10)** | **6 months**  **(n=10)** | ***p\**** |
| Six-minute walk (m) | 400 ± 62 | 387 ± 61 | **0.298** | 397 ± 69 | 396 ± 52 | **0.891** | 414 ± 45 | 420 ± 66 | **0.652** | 402 ± 40 | 441± 30 | **0.000** | ***0.178*** | **0.018** |
| Gait Speed (m/s) | 0.83 ± 0.15 | 0.96 ± 0.21 | **0.014** | 0.84 ± .17 | 0.95 ± .14 | **0.022** | 0.85 ± 0.14 | 1.0 ± 0.15 | **0.001** | 0.85 ± 0.51 | 0.98 ± 0.21 | **0.013** | ***0.535*** | **0.707** |
| Time Up and Go test (s) | 8.7 ± 1.7 | 8.8 ± 1.7 | **0.854** | 8.7 ± 1.9 | 8.7 ± 1.9 | **0.588** | 7.9 ± 1.2 | 7.5 ± 1.0 | **0.167** | 8 ± 1.3 | 7.8 ± 0.97 | **0.505** | ***0.029*** | **0.132** |
| 5t-sit to stand (s) | 10 ± 3.1 | 10.6 ± 2.8 | **0.881** | 10.5 ± 3 | 10.5 ± 2.7 | **0.938** | 8.1 ± 2.3 | 8.8 ± 1.9 | **0.429** | 8.2 ± 2.6 | 9.6 ± 2.7 | **0.278** | ***0.068*** | **0.469** |
| Short Physical Performance Battery (score) | 10.5 ± 1.5 | 10.5 ± 1.6 | **0.773** | 10.5 ± 1.4 | 10.9 ± 1.5 | **0.175** | 10.7 ± 1.0 | 11.5 ± 0.66 | **0.034** | 10.5 ± 0.97 | 11.2 ± 1.31 | **0.271** | ***0.025*** | **0.656** |
| Handgrip Strenght (kg) | 24 ± 7.9 | 25 ± 7.7 | **0.007** | 22.3 ± 6.5 | 24.2 ± 5.6 | **0.012** | 22 ± 11.3 | 26.9 ± 8.1 | **0.058** | 23.5 ± 9 | 26 ± 8 | **0.009** | ***0.618*** | **0.551** |

**Table 4. Changes in Physical Function.**

ONS, oral nutritional supplementation.

-p\*: Student´s t-test for intragroup comparison

-p+: Student´s t-test for comparison between groups (Measurements at 3 months)

-p++: Student´s t-test for comparison between groups (Measurements at 6 months)

**Table 5. Changes in the quality and quantity of muscle mass measured with computed tomography.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variables of muscle mass | ONS  (n=14) | | | ONS + EXERCISE  (n=10) | | | *P++* |
|  | **Baseline**  **(n=14)** | **6 months**  **(n=14)** | ***p\**** | **Baseline**  **(n=10)** | **6 months**  **(n=10)** | ***p\**** |
| Muscle attenuation (HU) | 52.3 ± 5.9 | 53 ± 3.7 | 0.592 | 54.6 ± 3.4 | 56 ± 3.3 | *0.280* | ***0.054*** |
| Mid-thigh cross-sectional area (cm2) | 96.2 ± 24 | 98 ± 20 | 0.138 | 100 ± 14 | 97 ± 12 | *0.205* | ***0.895*** |

ONS, oral nutritional supplementation. HU; Hounsfield units.

-p\*: Student´s t-test for intragroup comparison

-p++: Student´s t-test for comparison between groups (Measurements at 6 months)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variables of Quality of Life  **Table 6. Changes in the quality of life.** | ONS  (n=14) | | | ONS + EXERCISE  (n=10) | | |
| Specific part | **Pre** | **Post** | ***P\**** | **Pre** | **Post** | ***P\**** |
| Symptoms | 74.1 ± 11.9 | 82.4 ± 9.8 | **0.04** | 83.5 ± 6.1 | 86.1 ± 7.9 | **0.25** |
| Effects of kidney disease | 61.7 ± 21.3 | 73 ± 25 | **0.15** | 74.1 ± 12.3 | 74.4 ± 22 | **0.94** |
| Burden of kidney disease | 47.3 ± 15.6 | 59.3 ± 18.7 | **0.00** | 63 ± 14.7 | 57.8 ± 16.8 | **0.28** |
| Work status | 41.6 ± 41.7 | 50 ± 42.6 | **0.50** | 66.6 ± 38.9 | 62.5 ± 48.2 | **0.80** |
| Cognitive function | 25.5 ± 17.2 | 26.6 ± 17.9 | **0.85** | 15.5 ± 11.8 | 12.2 ± 9.7 | **0.35** |
| Quality of social interaction | 33.3 ± 15.8 | 27.7 ± 13.5 | **0.31** | 14.4 ± 9.7 | 19 ± 18 | **0.47** |
| Sexual function | 83.3 ± 28.8 | 75 ± 43.3 | **0.42** | 78.1 ± 31.1 | 65.6 ± 37.6 | **0.22** |
| Sleep | 66.8 ± 21.1 | 71.6 ± 13.7 | **0.42** | 78.7 ± 8.8 | 83.3 ± 13 | **0.17** |
| Social support | 62.4 ± 18.9 | 70.8 ± 16 | **0.13** | 66.6 ± 14.2 | 66.6 ± 25.6 | **1.00** |
| Dialysis staff encouragement | 77 ± 11.7 | 73.9 ± 8.3 | **0.38** | 73.9 ± 11.2 | 77 ± 4.8 | **0.33** |
| Patient satisfaction | 74.2 ± 17.2 | 68.1 ± 26.3 | **0.22** | 72.2 ± 16.4 | 68 ± 22.9 | **0.51** |
| Generic part | **Pre** | **Post** | ***p*** | **Pre** | **Post** | ***p*** |
| Physical function | 74.1 ± 15.6 | 75.4 ± 20.6 | **0.78** | 88.3 ± 8.3 | 86.2 ± 7.4 | **0.21** |
| Physical role | 56.2 ± 44.1 | 56.2 ± 44.1 | **1.00** | 87.5 ± 31 | 85.4 ± 34.4 | **0.79** |
| Pain | 85.6 ± 16.1 | 85.2 ± 21.8 | **0.94** | 74.7 ± 28.3 | 79.1 ± 30.4 | **0.61** |
| General health perceptions | 40.4 ± 13.8 | 46.6 ± 13.4 | **0.20** | 61.2 ± 9.5 | 58.7 ± 15.9 | **0.54** |
| Emotional well-being | 68.3 ± 18 | 73 ± 22.1 | **0.48** | 75.3 ± 16.2 | 82 ± 13.9 | **0.08** |
| Emotional role | 66.6 ± 34.8 | 66.6 ± 34.8 | **1.00** | 69.4 ± 36.1 | 97.2 ± 9.6 | **0.02** |
| Social function | 75 ± 25.5 | 94.7 ± 14.5 | **0.01** | 88.5 ± 13.5 | 86.4 ± 20.9 | **0.74** |
| Energy/fatigue | 61.6 ± 16.2 | 64.5 ± 18.6 | **0.58** | 70.8 ± 14.5 | 70.4 ± 18.1 | **0.94** |

Data are represented as mean ± standard deviation. ONS, oral nutritional supplementation.

-p\*: Student´s t-test for intragroup comparison

**Table 7. Changes in the biochemical indicators.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Biochemical Characteristics | ONS  (n=14) | | *p\** | ONS + EXERCISE  (n=10) | | *p\** | *P++* |
|  | **BASAL** | **FINAL** | **BASAL** | **FINAL** |
| Hemoglobin (g/dl) | 10.55 ± 2.3 | 9.6 ± 3.2 | ***0.443*** | 10.3 ± 1.6 | *10* ± 1.4 | ***0.653*** | ***0.710*** |
| Total lymphocytes count (cel/mm3) | 1120 ± 665 | 1000 ± 557 | ***0.317*** | 1148 ± 343 | *1065* ± 258 | ***0.427*** | ***0.737*** |
| Creatinine (mg/dl) | 13 ± 3.7 | 11.7 ± 4.8 | ***0.094*** | 12.6 ± 2.1 | *11.7* ± 4.2 | ***0.564*** | ***0.981*** |
| Albumin (g/dL) | 4.3 ± .44 | 4.0 ± 1.2 | ***0.423*** | 4.3 ± .52 | *4.3* ± .47 | ***0.894*** | ***0.432*** |
| Phosphorus (mg/dl) | 6 ± 2.4 | 5.2 ± 2.2 | ***0.113*** | 5.8 ± 1.8 | *5* ± 2.2 | ***0.142*** | ***0.803*** |
| Potassium (mmol/L) | 5.7 ± .81 | 5.1 ± 1.5 | ***0.121*** | 5.3 ± .63 | *4.6* ± 1 | ***0.154*** | ***0.418*** |
| CPR (mg/L) | 5.6 (1.8,9.8) | 2.3 (1.6,4.8) | ***0.245*** | 4.5 (1.8,8.0) | 7.2 (3.5,9.2) | ***0.386*** | ***0.026*** |

Biochemical indicators are represented as mean ± standard deviation or median (first and third quartiles). CRP, C-reactive protein; ONS, oral nutritional supplementation.

-p\*: Student´s t-test for intragroup comparison

-p++: Student´s t-test for comparison between groups (Measurements at 6 months)