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The factors associated with the ratio of insulin-like growth factor-1 to insulin-like growth factor binding protein-3 in CAPD Patients

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Background: An inverse relationship between plasma insulin like growth factor-I (IGF-1) levels and prevalence of metabolic syndrome as well as associated cardiovascular complications has been identified. Several studies reported that IGF-1 has anti-inflammatory effects and the ratio of IGF-1 to insulin-like growth factor binding protein-3 (IGFBP-3) can be used to estimate IGF-1 activity. The reports of plasma IGF-1/IGFBP-3 ratio in peritoneal dialysis patients have been limited. Therefore, we conducted this study to analyze the factors associated with IGF-1/IGFBP-3 ratio in CAPD Patients.

Methods: 75 incident patients (male: 43, DM: 28, icodextrin: 36, mean age: 46 years) finished a complete a 24 month protocol. We defined icodextrin group as once daily use of icodextrin more than 6 months. Clinical indices were measured in both groups at months 1 (baseline), 12, and 24. Plasma IGF-1, IGFBP-3, leptin and adiponectin were measured at months 1, 12, and 24. The measurement of body composition by BIA was performed at months 1, 12, and 24. Statistical analyses were performed using SPSS software program. Changes over time were compared using a paired t-test. Group differences were assessed by the two sample t-test or repeated measures ANOVA (RMA) or Pearson χ^2 test were used. The multiple regression tests were used to investigate the factors associated with IGF-1/IGFBP-3 ratio.

Results: There were significant increases in plasma IGF-1 (125.3±52.5 to 155.6±59.8 μg/L, $p<0.01$) and plasma IGFBP-3 (1814.9±676.5 to 2261.0±690.0 μg/L, $p<0.01$) over time. The IGF-1/IGFBP-3 ratio decreased over time (0.075±0.039 to 0.073±0.031), but it did not reached the significant difference. The DM group showed significant lower IGF-1/IGFBP-3 ratio at 24th month than the non-DM group (0.060±0.022 vs. 0.078±0.033 μg/L, $p<0.05$), and significant higher fat mass at 24th month than the non-DM group (18.6±5.5 vs. 15.5±6.6 kg, $p<0.05$). The higher IGF-1/IGFBP-3 ratio group at 24th month showed significant higher serum albumin than the lower IGF-1/IGFBP-3 ratio group at 24th month (3.73±0.42 vs. 3.54±0.40, $p<0.01$). The factors associated with IGF-1/IGFBP-3 ratio at 24th month were non-DM, use of icodextrin ($p<0.05$).

Conclusion: This study suggests that the application of icodextrin solution may be a better option to improve IGF-1/IGFBP-3 ratio in CAPD patients. We need further studies to clarify the factors associated with IGF-1/IGFBP-3 ratio and the impact of IGF-1/IGFBP-3 ratio on cardiovascular disease in CAPD patients.

Keywords: Insulin-like growth factor-1, peritoneal dialysis