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Short Communication

New Dietary Method to Improve Gut-Kidney Axis in CKD

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The number of chronic kidney disease patients (CKD) is increasing worldwide. The low protein diet was a traditional treatment to decrease proteinuria [1], and it was the only method until the 1960s' when hemodialysis was implemented. Since the 1980s, development of anti-hypertensive, anti-diabetic, diuretic drugs and recent SGL-2 inhibitors ignores the usefulness of low protein diet therapy.

However, these therapies have not decreased the number of end-stage renal disease (ESRD). Rigorous multidrug treatment was employed in the FROM-J and Doit3 studies in Japan, but the progression and complication of CKD in diabetic patients did not show a significant reduction [2,3].

Recently, the negative spiral of the gut-kidney axis has been found under the condition of CKD. Uremic dysbiosis is associated with endotoxemia and chronic inflammation, disrupting the intestinal barrier and depletion of beneficial bacteria producing short-chain fatty acids. So, it is impossible to quit CKD progression without controlling uremic dysbiosis and leaky gut. The sound effects of eating genmai (brown rice) on the intestinal environment and microbiota profiles suggest the usefulness of protein-reduced genmai for CKD patients [4].

We deleted rice protein from the brown rice bran layer by a special combination of enzyme solution and lactobacillus plantaris [5]. This processed low protein genmai (PLPG) is approved for the product and process JAS (Japan Agriculture Standard) from the Ministry of Agriculture, Fisheries, and Forestry. PLPG is characterized by (1) energy as same as white rice, (2) protein content is less than 0.2 g/100g boiled rice, (3) potassium being almost zero, (4) phosphorus being less than a quarter, (5) presence of dietary fiber, (6) g-oryzanol, and (7) antioxidant ability. These improved the negative spiral of the gut-kidney axis caused by uremic dysbiosis and leaky gut [6].

Dietary therapy for CKD patients is challenging to control both energy source intake and protein restriction simultaneously. We asked the patients to replace their staple foods with a PLPG package without restricting side dishes. A preliminary intervention study of 3 months of PLPG improved constipation by increasing *Blautia wexlerae, Bifidobacteria*, acetic acid, and decreasing harmful bacteria [7].

As expected, the protein intake decreased from 60 g to 50g a day. If 60 kg man eat 48g protein (0.8 g/kg body weight), 10g decrease becomes 38 g (0.62g/kg). If a 50 kg woman takes 40g protein, 10g decreased intake becomes 30g (0.6g/kg). So, people can easily practice a low protein diet to decrease protein intake.

There are several RCTs about the low protein diet, but the results are still debatable [8-14]. The programmed protein intake often became over at the end of the study, and the difference between control became small. Or total energy intake often becomes insufficient by reducing the diet.

So, we would say that almost all RCTs failed due to difficulty keeping the programmed amount of protein and energy source intake throughout the study period. RCTs involve many subjects and few observations. Individual difference is significant if we consider the gut-kidney axis and other intrabody metabolic networks. Taste preferences and receptivity to dietary advice are also influenced by personality [15].

Comparing pre-and post-assessment is a more straightforward and practical method under the solution-oriented strategy. In the future, single-case designs will be developed beyond case studies [16]. Daily, week-to-week, and month-to-month changes are essential in chronic diseases. Well-designed case studies such as observational epidemiology are often helpful in judging the effects of treatment by the bird's eyes.

Usually, dietary therapy is performed according to the guidelines, but the protein intake dose varies. Most guidelines are based on the RCT and meta-analysis. The National Institutes of Health, the Food and Drug Administration, and others that RCTs should be the gold standard for clinical research. However, as the randomized controlled trials could not be performed successfully, the basis of the guideline is unstable in CKD.

Fortunately, Japan Kidney Disease Association would start the PLPG intervention study on CKD patients by the pro- and post-comparison study. Diet is essential for patients with renal insufficiency, but compliance is not easy. However, a diet that only substitutes white rice for the PLPG package and has no strict limitations for side dishes is easy to maintain good adherence to protein control. Patients with renal failure took three PLPG packs a day, five days a week for three months, and were examined for changes in intestinal bacteria and short-chain fatty acids, urinary protein and renal functional changes, and other routine blood tests.

Diet therapy is the key to success through the patient's self-reliant will and is suitable for efforts involving patients. CKD's silent nature, with its unpredictable symptoms, is a significant barrier to motivating patients' behavioral changes and therapeutic decision-making by healthcare providers.

PLPG can be expected to be an excellent gospel for more than a hundred million people with renal failure and reserves. So, less restricted dietary guideline gives satiety to the patient. The plain clinical experience of open doctors should provide essential information [17].

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