Effect of telmisartan combined with levocarnitine on nutritional status in patients with peritoneal dialysis

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ABSTRACT

Objective: To explore the effect of telmisartan combined with levocarnitine on the nutritional status in patients with peritoneal dialysis (PD). Methods: A total of 80 patients with chronic renal failure (CRF) who were admitted in our hospital from November, 2011 to January, 2014 were included in the study and randomized into the treatment group and the control group. The patients in the two groups were performed with PD. The patients in the treatment group were given levocarnitine oral solution, 10 mL/time, 3 times/d, and telmisartan, 80 mg/time, 1 time/d. The patients in the control group were only given levocarnitine oral solution, 10 mL/time, 3 times/d. The patients in the two groups were continuously administrated for 24 weeks. A volume of 5 mL morning fasting elbow venous blood was extracted before and after treatment. The automatic biochemical analyzer was used to detect Hb, Alb, PA, TG, and TC. TSF and MAC were measured. MAMA was calculated. SGA was used to evaluate the nutrition. Results: After treatment, Hb, Alb, PA, TG, and TC were significantly elevated, while TG was significantly reduced when compared with before treatment (P<0.05), while TC was not significantly changed (P>0.05), those after treatment in the control group were not significantly different from those before treatment (P>0.05), and those in the treatment group were significantly superior to those in the control group (P<0.05). After treatment, BMI, MAMC, and TSF in the treatment group were significantly elevated, while SGA was significantly reduced when compared with before treatment (P<0.05), those after treatment in the control group were not significantly different from those before treatment (P>0.05), and those in the treatment group were significantly superior to those in the control group (P<0.05). Conclusions: Telmisartan combined with levocarnitine in application of PD patients can effectively improve the malnutrition, and correct the lipid metabolism disorder to delay the loss of residual renal function.

1. Introduction

Peritoneal dialysis (PD) is one of the main renal replacement therapy in the treatment of chronic renal failure (CRF), with its advantages of less interference on the immune system, small blood loss volume, low occurrence rate of hypotension, less chance of hematogenous infectious disease, and be feasible at home, but the issue of malnutrition is gradually emerging[1]. Due to lack of levocarnitine, malaise, nausea and vomiting, muscle cramp, and malnutrition can occur in PD patients, which can affect the patients’ living qualities[2]. With the extending of dialysis time, RRF is continuously decreasing, while malnutrition will in turn bring bad effects on RRF which is a main factor for determining PD patients’ living qualities and survival rate. ARB-like drugs can protect RRF and regulate the lipid metabolism to delay the loss of RRF[3,4]. The study aims to explore the effect of telmisartan combined with levocarnitine on the nutritional status in patients for PD.

2. Materials and methods
2.1. General materials

A total of 80 patients with CRF who were admitted in our hospital from November, 2011 to January, 2014 were included in the study, among which 46 were male, and 34 were female; aged from 30 to 70 years old, with an average age of (52.3±6.5) years old; course from 1 to 7 years, with an average course of (4.7±1.1) years; 42 had chronic glomerulonephritis, 20 had primary hypertension, and 18 had diabetic nephropathy. The patients were randomized into the treatment group and the control group with 40 cases in each group. The difference of the general materials between the two groups was not statistically significant (P>0.05).

2.2. Inclusion and exclusion criteria

Inclusion criteria: (1) those who were in accordance with the diagnostic criteria of CRF uremia[5], and were performed with regular and continuous out-of-bed PD treatment for more than 6 months; (2) those who RRF was greater than 2 mL/min, SCr was 5-9 mL/min, and 24 h urine volume was greater than 200 mL; (3) those whose conditions were stable; (4) those who had accepted hormones and immunosuppressants; (2) those who were allergic to related drugs.

2.3. Methods

The patients in the two groups were performed with PD. The patients in the treatment group were given levocarnitine oral solution (produced by Shenyang First Pharmaceutical Co. Ltd., Approval No. H20113215), 10 mL/time, 3 times/d, and telmisartan (produced by Beijing Wansheng Pharmaceutical Co. Ltd., Approval No. H20060442), 80 mg/time, 1 time/d. The patients in the control group were only given levocarnitine oral solution, 10 mL/time, 3 times/d. The patients in the two groups were continuously administrated for 24 weeks.

2.4. Observation indicators

A volume of 5 mL morning fasting elbow venous blood was extracted before and after treatment. The automatic biochemical analyzer was used to detect Hb, Alb, PA, TG, and TC. TSF and MAC were measured. MAMA was calculated. MAMC=MAC-3.14 TSF, BMI=body weight/hight². SGA[6] was used to evaluate the nutrition. The total score was 35. The higher the score was, the worse the nutritional status was, i.e. normal nutrition: 7 scores; mild and moderate malnutrition: 8-15 scores; severe malnutrition: 16 scores.

2.5. Statistical analysis

SPSS 19.0 software was used for the statistical analysis. The measurement data were expressed as mean±SD, and t test was used. Chi-square test was used for the enumeration data. P<0.05 was regarded as statistically significant difference.

3. Results

3.1. Comparison of biochemical indicators before and after treatment

The difference of Hb, Alb, PA, TG, and TC before treatment between the two groups was not statistically significant (P>0.05). After treatment, Hb, Alb, and PA in the treatment group were significantly elevated, while TG was significantly reduced when compared with before treatment (P<0.05), TC was not significantly changed (P>0.05), those after treatment in the control group were not significantly different from those before treatment (P>0.05), and those in the treatment group were significantly superior to those in the control group (P<0.05) (Table 1).

3.2. Comparison of nutritional status before and after treatment

The difference of BMI, MAMC, TSF, and SGA before treatment between the two groups was not statistically significant (P>0.05). After treatment, BMI, MAMC, and TSF in the treatment group were significantly elevated, while SGA was significantly reduced when compared with before treatment (P<0.05), those after treatment in the control group were not significantly different from those before treatment (P>0.05), and those in the treatment group were significantly superior to those in the control group (P<0.05) (Table 2).

4. Discussion

Uremia is the terminal stage of CRF, and is a common outcome...
of various kidney diseases due to their continuous development[7]. Renal tissue fibrosis is mainly involved in the pathological change of CRF, showing in the chronic and progressive renal parenchyma damage whose further development will cause RRF difficult to maintain the basic renal function, resulting in metabolic retention, water-electrolyte and acid-base disturbance, which can severely affect the patients’ physical health[8]. RRF can eliminate the large, middle, and small molecular toxic substances, regulate water-electrolyte and acid-base balance, and partial endocrine function, effectively get ride of homotype cysteine, stabilize the internal environment, and it is argued that RRF can not be replaced by the dialysis; therefore, protection of RRF is of great significance in guaranteeing the dialytic efficiency and reducing the occurrence of complications[9].

The abnormal lipid metabolism is mostly involved in uremia patients, and will promote the formation of atherosclerosis (AS) which is an important risk factor for developing coronary heart disease; therefore, protection and treatment of abnormal lipid metabolism in CRF patients are of great clinical significance in protecting RRF and reducing the occurrence of cardiovascular diseases[10]. Malnutrition is prevailing in PD patients. With the extending of PD time, the occurrence rate of malnutrition is gradually increasing, showing in reduced Alb and subcutaneous fat, and anemia, which can severely affect the patients’ prognosis and living qualities; moreover, malnutrition is associated with the inflammatory reaction, can reduce the resistance, and increase the susceptibility[11].

Carnitine deficiency is prevailing in PD patients in that the reduced diet supplementation and levocarnitine synthesis by the kidney can cause the lack of levocarnitine, resulting in a series of metabolic disorder to cause myasthenia, resist EPO, increase the erythrocyte fragility, and affect anemia; therefore, supplementation of levocarnitine in PD patients can improve the malnutrition, increase TP and Alb levels, alleviate the resistance to EPO, improve the nutritional status, and enhance the living qualities[2,12]. The clinical materials demonstrate that supplementation of levocarnitine in PD patients can improve the symptoms of malaise, anemia, and convulsion in ESRD patients, inhibit the production of pro-inflammatory cytokines and the activation of peripheral blood mononuclear cells, reduce the acute phase reaction protein, alleviate the micro-inflammation state, enhance the serum Alb, TRF, and Hb levels, and improve the nutritional status[13]. ARB can reduce the systemic blood pressure and protect the kidney, whose mechanism is to reduce the accumulation of extracellular matrix, antagonize the glomerular sclerosis, reduce the proteinuria, and prevent or reverse the renal interstitial fibrosis to protect RRF[14]. Telmisartan is a new ARB-kind drug, is of activity, and can promote the positive and negative charges of crystal structure reach the balance due to its combination with a different aromatic substitution in the core of benzimidazole, which can strengthen the combining capacity of telmisartan and AT1 receptor, increase the lipid solubility after administration, and contribute to enhance the concentration in the tissues[15]. It is reported that telmisartan can delay the progression of kidney diseases for patients with non-dialysis, and can protect RRF for ESRD patients[16].

The results in the study showed that after treatment, Hb, Alb, and PA in the treatment group were significantly elevated, while TG was significantly reduced when compared with before treatment (P<0.05), TC was not significantly changed (P>0.05), those after treatment in the control group were not significantly different from those before treatment (P>0.05), and those in the treatment group were significantly superior to those in the control group (P<0.05), indicating that telmisartan combined with levocarnitine can significantly delay the descending speed of RRF, and improve the nutritional status.

In conclusion, telmisartan combined with levocarnitine in application of PD patients can effectively improve the malnutrition, and correct the lipid metabolism disorder to delay the loss of RRF.

References