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Article

The Effect of Finerenone on SII, PLR, NLR, MLR, NHR, and SIRI in Patients with Type 2 Diabetic Nephropathy

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Abstract: Objective: To discuss and analyze the effects of routine therapy combined with fenethisterone on serum systemic immune inflammation index (SII), platelet to lymphocyte ratio (PLR), neutrophil to lymphocyte ratio (NLR), monocyte to lymphocyte ratio (MLR), neutrophil to high density lipoprotein ratio io, NHR) and Systemic Inflammation Response Index (SIRI). Methods: 60 patients with type 2 diabetes nephropathy admitted to our hospital from April to August 2020 were studied, including 20 patients with normal urinary protein, 20 patients with microalbuminuria and 20 patients with massive proteinuria. Patients with different proteinuria conditions were randomly divided into a control group and an experimental group, with 10 cases in each group. The control group received conventional therapy, while the experimental group received combined treatment with non nifedipine. Analyze and compare the changes in SII, PLR, NLR, MLR, NHR, and SIRI indicators between two groups of patients after intervention. Results: The serum SII, PLR, NLR, MLR, NHR, SIRI in patients with type 2 diabetes nephropathy with normal urinary protein, microalbumin and large proteinuria who were treated with fenelidone were significantly reduced, $p < 0.05$, The difference is significant. Conclusion: The combination of conventional therapy and fenelidone can effectively improve the immune function of patients with type 2 diabetes nephropathy and reduce the inflammatory reaction of the body. It is an effective therapeutic drug and can be used in such patients.

Keywords: nonalidol; diabetes nephropathy; urinary microalbumin; systemic immune inflammatory index; systemic immune inflammatory index

1. Introduction

With the acceleration of population aging in China and the continuous formation of various unhealthy habits, more and more basic diseases show a trend of increasing incidence rate in clinical practice [1]. Diabetes nephropathy is one of the common complications of type 2 diabetes patients. This complication does not show obvious symptoms at the early stage, but with the gradual increase of renal function involvement, the number of residual glomeruli and other renal functional units of the patient gradually decreases, and edema, oliguria and even internal environment disorder will gradually appear [2,3]. It is clear that in addition to actively controlling blood sugar, other drugs can also be used to treat patients with diabetes nephropathy. Feneridone is a mineralocorticoid receptor antagonist, which can improve renal function and overall prognosis of patients with diabetes nephropathy by anti-inflammatory, anti fibrosis, regulating blood pressure, improving lipid metabolism, etc. [4,5]. However, there is limited research on the clinical application of this drug. In order to guide clinical medication and treatment, this study selected 60 patients admitted to our hospital for analysis.

2. Materials and Methods

2.1. Clinical Data

The study selected 60 patients with type 2 diabetes nephropathy admitted to our hospital from April to August 2020, including 20 patients with normal urinary protein, 20 patients with microalbuminuria and 20 patients with massive proteinuria. Patients with different proteinuria conditions were randomly divided into a control group and an experimental group, with 10 cases in each group. The control group of patients with normal urinary protein ranged in age from 42 to 75 years, with an average of (54.46 ± 7.29) years; There were 5 males and 5 females. The experimental group of patients with normal urinary protein ranged in age from 40 to 80 years, with an average of (54.55 ± 7.53) years; There were 4 males and 6 females. The control group of patients with microalbumin ranged in age from 39 to 75 years, with an average of (54.22 ± 7.40) years; There were 5 males and 5 females. The experimental group of patients with microalbumin ranged in age from 40 to 78 years, with an average of (54.29 ± 7.38) years; There were 6 males and 4 females. The control group of patients with a large amount of proteinuria ranged in age from 37 to 77 years, with an average of (54.44 ± 7.44) years; There were 6 males and 4 females. The experimental group of patients with a large number of proteinuria ranged in age from 44 to 79 years, with an average of (54.35 ± 7.31) years; There were 5 males and 5 females. There was no significant difference between the two groups of data ($p > 0.05$).

Grouping criteria: Normal urinary protein group, urinary albumin/creatinine ratio < 30 ug/mg; The ratio of urinary albumin to creatinine in the microalbumin group is 30–299 ug/mg; The urinary albumin/creatinine ratio in the group with a large amount of proteinuria is greater than 300 ug/mg.

Inclusion criteria: ① It meets the diagnostic criteria for type 2 diabetes nephropathy (WHO standard). ② Informed consent for research and active cooperation in follow-up work. Exclusion criteria: ① Abnormal renal function caused by other reasons. ② Serious complications of diabetes include ketoacidosis, acute infection or hyperosmolar coma. ③ Accompanied by cognitive impairment. ④ Lost follow-up.

2.2. Methods

The control group received conventional therapy. Engerliejing tablets (produced by Chia Tai Tianqing Pharmaceutical Group Co., Ltd., Lianyungang, China. National Medical Products Approval No. H20213065, 10 mg/tablet) are orally administered once a day, 10–20 mg per dose, adjusted according to blood glucose control. Simultaneously conducting health education, adjusting diet, and appropriately increasing exercise and other interventions.

The experimental group was treated with combination therapy of non nifedipine. Fenalidone (produced by Bayer Healthcare Co., Ltd., Beijing, China, with the national drug approval number HJ20220057, 10 mg/tablet) tablets are taken orally once a day, 10 mg each time.

Both groups of patients received continuous treatment for 12 weeks.

2.3. Observation Indicators

Analyze and compare the changes in SII, PLR, NLR, MLR, NHR, and SIRI indicators between two groups of patients after intervention.

2.4. Statistical Methods

Data were analyzed using SPSS 22.0 software. Categorical data were expressed as cases (%) and analyzed using the chi-square (χ^2) test. Continuous data were expressed as mean ± standard deviation ($\bar{x} \pm s$) and analyzed using the independent samples *t*-test. A *p*-value of less than 0.05 was considered statistically significant.

3. Results

3.1. Comparison of Serological Indicators in Patients with Normal Urinary Protein after Intervention

The serum indicators of the experimental group patients were significantly reduced after intervention, and the difference was significant ($p < 0.05$). See Table 1.

Table 1. Comparison of serological indicators in patients with normal urinary protein after intervention ($\bar{x} \pm s$).

Group	N	SII (/)	PLR (/)	NLR (/)	MLR (/)	NHR (/)	SIRI (/)

control group	10	664.45 ± 58.52	162.87 ± 28.62	4.15 ± 0.79	0.73 ± 0.24	3.10 ± 0.47	2.38 ± 0.58
experimental group	10	466.62 ± 57.90	123.69 ± 17.85	3.02 ± 0.55	0.51 ± 0.10	2.22 ± 0.25	1.46 ± 0.33
t	-	7.599	3.674	3.712	2.676	5.227	4.360
p	-	<0.001	0.002	<0.001	0.015	<0.001	<0.001

3.2. Comparison of Serological Indicators in Patients with Microalbumin after Intervention

The serum indicators of the experimental group patients were significantly reduced after intervention, and the difference was significant ($p < 0.05$). See Table 2.

Table 2. Comparison of serum indicators in microalbumin patients after intervention ($\bar{x} \pm s$).

Group	N	SII (/)	PLR (/)	NLR (/)	MLR (/)	NHR (/)	SIRI (/)
control group	10	721.52 ± 73.66	222.67 ± 38.38	4.65 ± 0.87	0.80 ± 0.30	3.56 ± 0.58	2.76 ± 0.78
experimental group	10	543.10 ± 61.42	150.45 ± 22.77	3.25 ± 0.60	0.55 ± 0.11	2.51 ± 0.29	1.52 ± 0.40
t	-	5.883	5.118	4.189	2.474	5.120	4.474
p	-	<0.001	<0.001	<0.001	0.024	<0.001	<0.001

3.3. Comparison of Serological indicators after Intervention in A Large Number of Proteinuria Patients

The serum indicators of the experimental group patients were significantly reduced after intervention, and the difference was significant ($p < 0.05$). See Table 3.

Table 3. Comparison of serological indicators in patients with large amounts of proteinuria after intervention ($\bar{x} \pm s$).

Group	N	SII (/)	PLR (/)	NLR (/)	MLR (/)	NHR (/)	SIRI (/)
control group	10	764.32 ± 88.46	246.29 ± 43.15	4.95 ± 0.97	0.95 ± 0.31	3.78 ± 0.69	2.84 ± 0.87
experimental group	10	615.40 ± 70.28	166.39 ± 27.50	3.52 ± 0.61	0.64 ± 0.14	2.64 ± 0.32	1.57 ± 0.47
t	-	4.168	4.938	3.946	2.882	4.740	4.061
p	-	<0.001	<0.001	<0.001	0.010	<0.001	<0.001

4. Discussion

Diabetes nephropathy is a disease that causes renal dysfunction due to the damage of renal tubules caused by hyperglycemia. With the progress of the disease, the renal function of patients will be affected. In terms of relevant laboratory tests, it is mainly reflected in the increase of creatinine level and the increase of urinary microprotein. Research indicates that urinary microprotein is one of the main reference indicators that can reflect the severity of diabetes nephropathy [6,7]. How to effectively treat the patients with diabetes nephropathy is an important problem that needs to be concerned and solved in clinical practice. Although traditional drugs such as empagliflozin can alleviate and improve kidney function to a certain extent by controlling blood sugar, their overall effect is relatively limited and there are significant individual differences [8]. In recent years, as a non steroidal mineralocorticoid receptor antagonist, fenelidone has been considered to play a relatively good role in patients with diabetes nephropathy [9,10].

This study analyzed the effects of fenelione on SII, PLR, NLR, MLR, NHR, SIRI in patients with type 2 diabetes nephropathy. It was found that in patients with normal urinary protein, microalbuminuria or massive proteinuria, all inflammatory indicators in the experimental group treated with fenelione were significantly lower than those in the control group treated with conventional treatment, indicating that fenelione has significant anti-inflammatory effect. Mechanistically, non steroidal corticosteroids, as a novel non steroidal mineralocorticoid receptor antagonist, can effectively counteract the overactivation of mineralocorticoid receptors [11,12]. In patients with type 2 diabetes nephropathy, high glucose status and metabolic disorder can lead to abnormal activation of mineralocorticoid receptor signaling pathway, thereby promoting the expression of a variety of proinflammatory factors and pro fibrosis factors, leading to persistent micro inflammatory state and oxidative stress response. This chronic low-grade inflammation is one of the important mechanisms of the occurrence and development of diabetes nephropathy, and is directly reflected in the increase of inflammatory markers such as SII, NLR, PLR, etc. Non nifedipine precisely blocks mineralocorticoid receptors, upstream inhibiting the transmission of inflammatory signals, reducing the infiltration and activation of inflammatory cells, and effectively reducing the

composite inflammatory indicators calculated from neutrophil, monocyte, platelet, and lymphocyte counts [13]. In addition, this study also observed that non nifedipine exhibited consistent anti-inflammatory effects in patients with different levels of proteinuria. This indicates that its anti-inflammatory mechanism is independent of its proteinuria lowering effect and may directly act on immune and inflammatory pathways [14]. Although conventional treatment can control risk factors such as blood glucose and blood pressure to a certain extent, it fails to fully target the inflammatory process mediated by mineralocorticoid receptors, resulting in limited improvement of inflammatory indicators [15]. However, the combined use of finaridone makes up for this deficiency and provides a multi-target, more comprehensive renal protection for diabetes nephropathy.

To sum up, the combination of conventional therapy and fenelidone treatment for type 2 diabetes nephropathy patients can effectively improve the immune function of patients and reduce the inflammatory reaction of the body. It is an effective therapeutic drug and can be used in such patients.

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Author Contributions

Writing—original draft, X.L., Y.Z. (Yaguang Zhang), Y.Z. (Yamin Zhao) and Y.L.; writing—review and editing, X.L., Y.Z. (Yaguang Zhang), Y.Z. (Yamin Zhao) and Y.L. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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