EFFECT OF MYOSTATIN IN PATIENTS WITH UREMIA AFTER DIFFERENT BLOOD PURIFICATION TREATMENTS

Emama Arshad Abbasi[a*], Ayesha Rehman[b], Nisha Hamid Awan[c], Shoukat Bukhari[d], Javeria Qadeer Abbasi[e], Mumtaz Ahmad[f], Shaista Shabir Raja[g], Amna Akbar[h], Sarosh Khan Jadoon[i]

Abstract:

Objective: To investigate the analysis of myostatin and therapeutic effects in uremia patients after different blood purification treatments.

Methods: A total of 60 patients diagnosed with uremia in our hospital from May 2022 to May 2023 were retrospectively analyzed, all of whom were diagnosed with chronic uremia by doctors. The 60 patients were separated into a test group and a reference group of 30 each. The test group was treated with continuous blood purification, and the reference group was treated with intermittent blood therapy. The total treatment period was 5 weeks. Serum myostatin (MSTN), hemoglobin, red blood cells, serum creatinine, blood urea nitrogen (BUN) and other indicators were compared between the two groups of patients, and the differences between the two blood purification treatments were evaluated.

Results: Comparing the treatment effects between the test group and the reference group, there are certain differences in the treatment effects, and the treatment cost of the reference group is obviously lower than that of the test group ($P < 0.05$). The test group has a better effect on the MSTN clearance of patients than the reference group and has a better recovery of muscle function in patients. In the comparison of toxin removal effect, the overall performance of the reference group was worse than that of the test group ($P < 0.05$). Serum phosphorus decreased significantly in both groups before and after treatment, especially in the test group, and the comparison had statistical significance ($P < 0.05$). In the comparison of hemoglobin content, the test group decreased significantly before and after treatment ($P < 0.05$). The two treatment options did not have much impact on the vital signs of the patients.

Conclusion: Both schemes can alleviate the condition of uremia patients. Compared with indirect dialysis, continuous dialysis is more comprehensive, and the patient's remission effect is better within the same treatment time.

Keywords: Uremia; Blood purification; Clinical treatment; Myostatin

[a*]Houseofficer, Combined Military Hospital, Muzaffarabad, AJK, Pakistan, arshademama26@gmail.com
[b]Houseofficer, Abbas Institute of Medical Sciences, Muzaffarabad, AJK, Pakistan, drayesharehman02@gmail.com
[c]Resident Medicine, Combined Military Hospital, Muzaffarabad, AJK, Pakistan, nishahamidawan@gmail.com
[d] Medical Specialist, CMH/SKBZ, Muzaffarabad, AJK, Pakistan, bukharishoukat33@gmail.com
[e]Post Graduate Trainee Medicine, Combined Military Hospital, Muzaffarabad, AJK, ja.abbasi764@gmail.com
[f]HOD Pathology, Abbas Institute of Medical Sciences, Muzaffarabad, AJK, Pakistan, mumtazahmad8166@gmail.com
[g]MBBS, Poonch Medical college Rawalakot, AJK, Pakistan, shaistashabir846@gmail.com
[h]Medical Officer, District Headquarter Hospital Jhelum Valley, AJK, Pakistan, amna.akbar1324@gmail.com, https://orcid.org/0009-0009-6560-5493
[i]Resident Surgeon, Combined Military Hospital, Muzaffarabad, AJK, Pakistan, saroshkhanjadoon@outlook.com, https://orcid.org/0000-0002-1728-2599

***Corresponding Author:** Emama Arshad Abbasi
*Houseofficer, Combined Military Hospital, Muzaffarabad, AJK, Pakistan, arshademama26@gmail.com

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Introduction:

In recent years, more and more young people are suffering from chronic kidney disease (CKD), and it has become one of the major diseases threatening the health of modern people. According to literature, the global incidence of CKD is 9.1% [1], whereas in Pakistan, the overall incidence is 21.2%-23.3% [2,3]. Uremia is a condition, which belongs to the advanced stage of kidney disease, and the renal function of the patient is impaired, accompanied by irreversible mental illness [4-6] . According to modern medical research, the pathogenesis of uremia is complex and related to personal living habits, diet and genetics. Long-term consumption of unhealthy food and staying up late are one of the main causes of kidney disease [7-9]. At the same time, genetic inheritance and impaired immune system are also one of the main causes of kidney disease and uremia. The clinical manifestations of uremia patients are mainly memory loss, physical fatigue, and easy drowsiness. At the same time, some uremia patients have certain sarcopenia, and many patients have certain complications as the duration of dialysis increases, which seriously affects the lives of patients [10-12]. Uremia can lead to irreversible damage to the kidneys, which cannot be completely cured by medicine and surgery. At present, uremia is mainly treated by dialysis, and the therapeutic effects of different dialysis methods are different. Blood purification is the main dialysis method. Compared with peritoneal dialysis, hemodialysis has less harm to patients, high efficiency of toxin removal, and protein loss [13-14]. Therefore, the use of blood purification to treat uremia aims to discuss the therapeutic effects of different hemodialysis methods on patients through the analysis of different hemodialysis treatment methods and provide effective clinical treatment basis for uremia treatment.

1 Materials and methods

1.1 General Information

A retrospective analysis was conducted in our hospital from May 2022 to May 2023. A total of 60 patients with uremia were diagnosed. All of them passed the tests of blood routine, urine routine, electrolytes, and renal function. 60 cases were all patients with chronic uremia. Among the 60 patients, there were 45 patients with primary diseases, including 30 cases of diabetic nephropathy, 15 cases of chronic glomerulonephritis, 4 cases of benign arteriolar nephrosclerosis, and 11 cases of chronic tubulointerstitial nephritis. Other diseases of the patients were excluded, and the age range was 32-46 years old . Among them, there were 31 male cases and 29 female cases. Inclusion criteria were: (1) The included patients had passed the hospital standard test and met the diagnostic criteria for patients with chronic uremia; (2) The age of the included patients with uremia was between 18 and 65 years old; (3) Safety testing was carried out on all patients participating in the treatment experiment. The patients had no liver disease, acute cardiovascular disease and other malignant diseases, and had no effect on the treatment of uremia ; (4) The 60 patients participating in the treatment underwent routine index review, including electrolytes, renal function and thyroxine did not change significantly; (5) All the patients participating in the treatment had hemodialysis experience for more than 12 months, and each dialysis time was about 4 hours; (6) The patients participating in the treatment had hemodialysis treatment through arteriovenous fistula; (7) The operation was approved by the patient's family members and the patient, and the operation responsibility agreement was signed; (8) The patients participating in the treatment did not have blood transfusion within 3 months; (9) The participating patients did not have blood transfusions that may cause muscle dysfunction diseases, including cerebrovascular diseases, external injuries, malignant tumors, etc. The basic data of the patients involved in the treatment are shown in Table 1.

1.2 Method

1.2.1 Surgical experimental method

The 60 patients diagnosed with uremia were separated into a test group and reference group, with 30 cases in each group. It has no statistical difference between the two groups ($P > 0.05$). In the uremia treatment experiment, the patients in the reference group were received with the 4008B hemodialysis machine made in Germany, and the patients in the test group received continuous blood purification equipment of Aquarius for hemodialysis. In the dialysis treatment in the reference group, the temperature of the dialysate was 36.5°C, the flow rate was 500-800ml/min, the dialysate was bicarbonate, the bacteria content was less than 100 colonies/ml, and the endotoxin content was less than 0.25U/ml. In the experiment, the water treatment device was transferred to the German Aquaboss Eco Ron, which is suitable for ultrapure water for dialysis. In the test group treatment, 500ml of dialysis replacement solution

contained 5% glucose, 10ml contained 10% calcium gluconate, 1500ml contained 0.9% sodium chloride and 1.6ml contained 25% magnesium sulfate. At the same time, during the dialysis treatment of the test group, the concentration of potassium ions was adjusted according to the patient's condition index. In continuous hemodialysis treatment, 24-hour hemodialysis treatment was used for severe patients. Based on the patient's condition, the single dialysis treatment time in the test group was between 7h and 12h, and each patient needed to be treated 1 to 3 times a day. Depending on the blood access of the patient, two continuous dialysis schemes were selected: continuous veno-venous hemofiltration and continuous arterio-venous hemofiltration. In reference group, the length of time of a single dialysis treatment was between 2h and 4h, and the number of treatments per week was between 4 and 6 times.

Table 1 Basic data of patients participating in the experiment

Basic indicators	Test group	Reference group	P
Age	36.24±4.35	38.63±3.35	0.288
Male	15	15	0.226
Female	15	14	0.229
*P*atient weight (kg)	62.65	61.35	0.389
Patient height (cm)	162.45	16156	0.245
Average duration of dialysis (months)	55.05±31.65	56.05±31.65	0.325
Serum mstn (ng/ml)	5.13 ±0.24	5.05 ±0.22	0.245
Hemoglobin (g/l)	102±9.65	103±9.73	0.356
Albumin (g/l)	32.12±1.65	31.25±2.73	0.289
Serum creatinine (1 mol/l)	984.65±224.25	976.24±221.65	0.356
Interleukin-6 (pg /ml)	29.24±4.85	28.64±5.02	0.325
Blood urea nitrogen (mmol/l)	26.87±5.65	30.45±2.73	0.616

1.2.2 Drug-assisted treatment

During dialysis treatment, for patients with primary diseases, diabetic patients needed to cooperate with insulin, calcium ion antagonists, angiotensin-converting enzyme inhibitors, etc. to control blood sugar, and for hypertension, angiotensin II receptor antagonists were used for drug treatment. For complications caused by uremia, patients with anemia were be treated with erythropoietin and vitamin B12 during dialysis.

1.3 Evaluation Criteria

During the treatment of uremia patients, (1) Renal function tests: blood urea nitrogen (BUN), uric acid (UA), serum creatinine (SCr), retinol binding protein (RBP) and other indicators before and after treatment were detected. (2) Electrolyte tests to check the changing ratio of blood chloride, blood calcium, blood potassium, blood phosphorus and other indicators before and after treatment. Electrolyte disorders such as hypochloremia, hyperkalemia, and hypocalcemia during treatment proportion were noted. In the detection of calcium and phosphorus, the standard is that the product is less than 55mg/dl (4.44mmol/l). (3) Routine blood tests to check the hemoglobin, red blood cells and other indicators of patients before and after treatment. (4) Detection of physical characteristics of patients, including diastolic blood pressure (DBP) (mmHg), systolic blood pressure (SBP) (mmHg), heart rate (times/minute), mean arterial pressure (MAP) (mmHg) during treatment etc. for detection. (5) Complication detection, which mainly checks bleeding events, dialysis imbalance, dialysis hypotension, and dialysis hypertension in patients during treatment. (6) Detect myostatin (MSTN) (ng/ml) in blood of patients after treatment.

1.4 Statistical methods

The software SPSS 23.0 was used to process postoperative data. At the same time, the measurement data were presented by $\pm$ standard deviation , and the qualitative $(\overline{x} \pm s)$ data χ^2 were expressed by the number of cases (percentage %). P <0.05 indicates that the comparison of data has statistical significance.

2 Results

2.1 Comparison of treatment improvement time

The improvement time after treatment of the two groups of patients can reflect the differences of the two treatments. The improvement time and cure time of the two groups of patients treated with dialysis were counted. Figure 1 (a) shows the treatment results of the patients in the test group. According to the outcomes, the symptoms of the test group improved after 1.35±1.05 days, and the patients were cured after 3.79±1.96 days. Figure 1 (b) shows the treatment results of patients in the reference group. In contrast to the test group, the number of improvement and days in the reference group were longer, 2.79±1.72 days and 5.36±2.76 days, respectively. In the comparison of the improvement days, the comparison of the experimental data has statistical significance (t =3.756, P <0.001), and the comparison of the recovery days of the two groups had statistical significance (t =2.556, P <0.001).

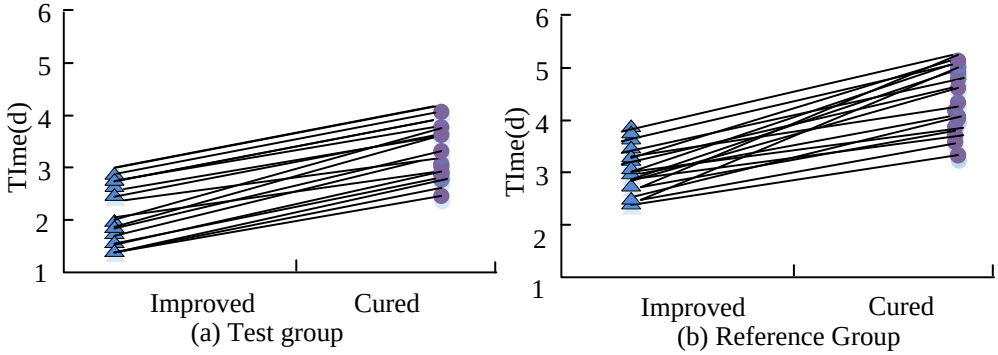


Figure 1 Comparison of symptom improvement and recovery time between two groups of patients

2.2 Comparison of renal function after treatment

Figure 2 (a) shows the results of serum creatinine levels in the two groups of patients. There was no statistical significance in the two groups' comparison before and after treatment (t =0.71, P =0.423; t =-0.359, P =0.756). During the 5 days of treatment, the serum creatinine of the two groups of patients decreased significantly, and the levels of the test group and the reference group were 510.78±235.13 (umol / L), 539.86 ± 245.53 (umol / L), the comparison before and after the experiment had statistical significance (P <0.00 5). Figure 2 (b) shows the clearance ratio of patients after treatment. The clearance ratio of the test group was 20.61 ± 32.75 %, and the clearance ratio of the reference group was 37.14 ± 23.57 %. The comparison has no statistical significance (P >0.005).

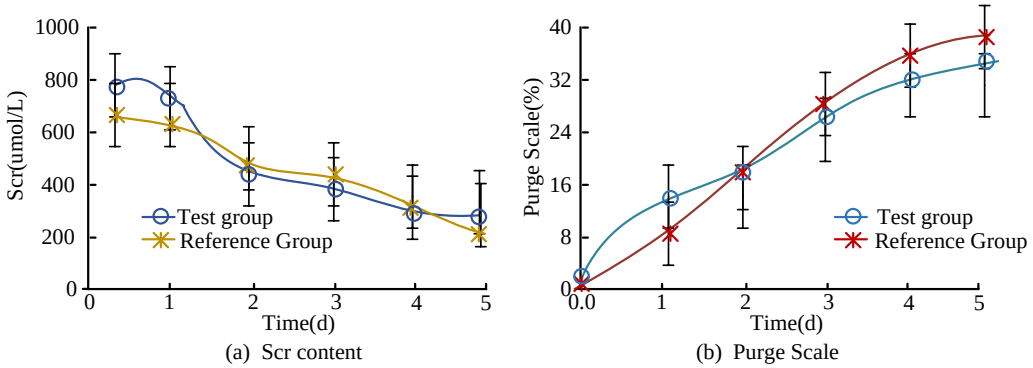


Figure 2 Comparison of blood creatinine between two groups of patients

Figure 3 is the results of the blood urea nitrogen content and clearance ratio of the patients after treatment. The urea nitrogen content of the two groups of patients reduced greatly before and after the treatment, and the comparison before and after the experiment have statistical significance (P <0.005). In the clearance ratio, it has a significant difference between the two groups, and the comparison has statistical significance (t = 2.325, P <0.005). The clearance ratio of the test group was 25.68±32.41%, and the clearance ratio of the reference group was 50.11 ± 22.15%.

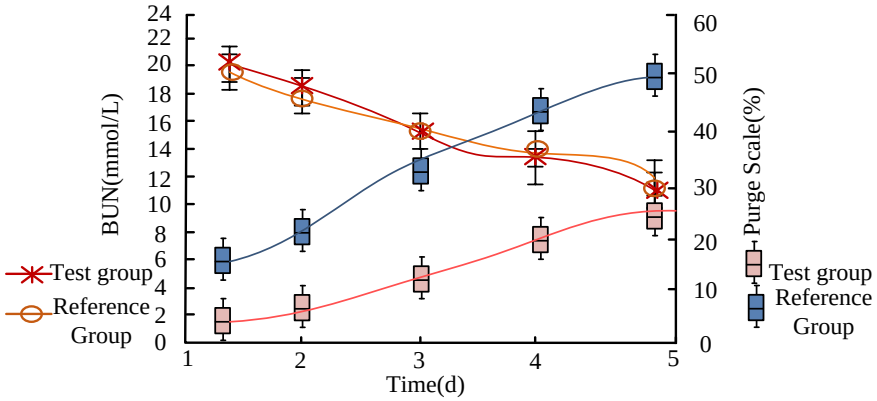
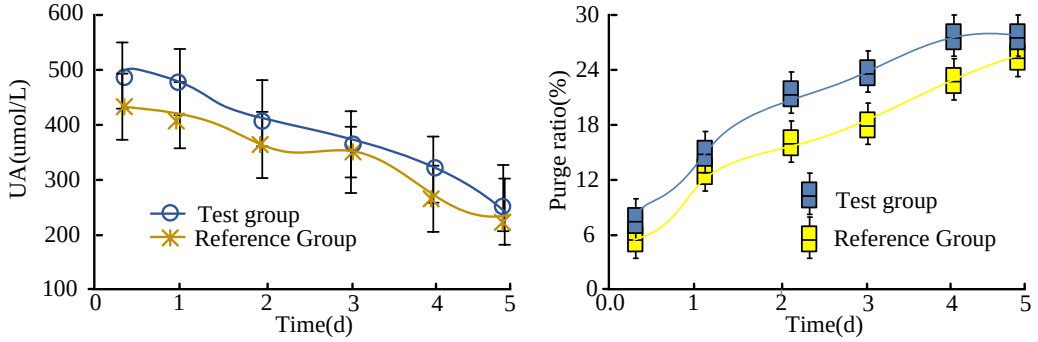


Figure 3 Comparison of blood urea nitrogen content and clearance ratio before and after treatment

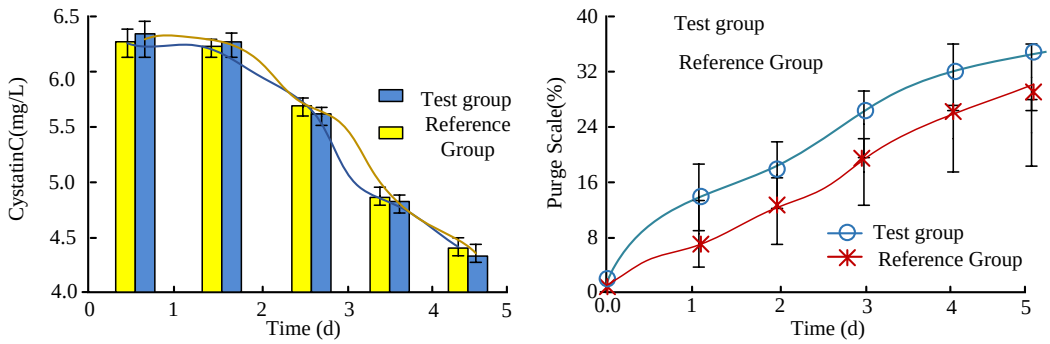
Figure 4 (a) shows the comparison results of blood uric acid levels before and after treatment. Before treatment, the test group and reference group were 369.56 ± 189.76 (umol/L), 461.12 ± 161.21 (umol/L), after treatment they were 265.35 ± 108.28 (umol/L), 28.56 ± 84.63 (umol/L), the blood levels of the two groups before and after treatment. The uric acid content decreased significantly, and the comparison before and after has statistical significance ($P < 0.005$). Figure 4 (b) shows the clearance ratio. The clearance ratio of the test group was 26.25±31.25%, and the clearance ratio of the reference group was 26.12 ± 30.12 %. There was no statistical significance ($P > 0.005$).



(a) UA Comparison (b) Purge ratio

Figure 4 Comparison of blood uric acid content and clearance ratio before and after treatment

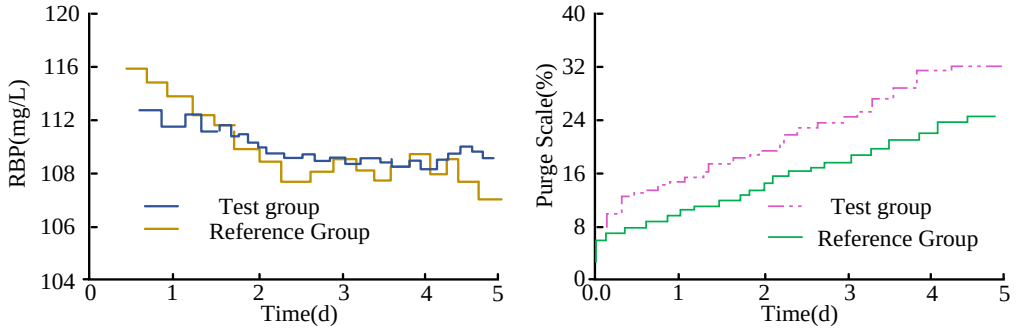
Figure 5 (a) shows the results of the comparison of cystatin C before and after treatment. The levels of cystatin C in the two groups of patients reduced dramatically before and after treatment, and the data before and after the experiment has statistical significance ($P < 0.005$). After treatment for 5 days, the levels in the test group and the reference group *were 4.29±1.43 (mg/L) and* 4.4 ±1.51 (mg/L), respectively, and it has no statistical significance in the comparison between the two groups ($P > 0.005$). Figure 5 (b) is the results of the clearance rate. The clearance rate between the two groups has a significant difference. The test group is 18.36±22.99%, the reference group is 3.48 ± 29.01 %, and the two groups' comparison has statistical significance ($P < 0.005$).



(a) CystatinC content (b) Purge Scale

Figure 5 Comparison of cystine protease inhibitor C content and clearance ratio before and after treatment

The content of retinol-binding protein in patients before and after treatment is shown in Figure 6 (a). The content of retinol-binding protein in the reference group decreased to a certain extent before and after treatment, but there was no statistical significance in the comparison between before and after treatment (P > 0.005). The content of flavanol-binding protein decreased significantly, from 78.95 ± 30.95 (mg/L) before treatment to 76.56 ± 21.39 (mg /L) after treatment. The comparison before and after treatment was statistically significant (P < 0.005). Figure 6 (b) shows the results of the clearance ratio, the test group was 7.84 ± 27.67 %, the reference group was -20.78 ± 43.45%, and the comparison between the two groups was statistically significant (t = -3.256, P < 0.005).



(a) RBP content (b) Purge Scale

Figure 6 Comparison of Retinol Binding Protein Content and Clearance Ratio before and after Treatment

2.3 Comparison of changes in electrolytes during treatment

In Table 2, the comparison results of blood potassium content, hyperkalemia and blood phosphorus content of patients before and after treatment. Before the experiment, there was no statistical significance in the comparison of blood potassium content, hyperkalemia and blood phosphorus content between the two groups (P > 0.005). In the comparison of blood potassium content, there was no significant difference between the test group and the reference group before and after treatment, and the data before and after treatment were not statistically significant (P > 0.005). In the comparison of the change ratio of blood potassium, the reference group was 20.39±14.90%, and the test group was 15.01±11.06%, and the comparison between the two groups was statistically significant (P <0.005). In the comparison of hyperkalemia, the reference group was 15.38% before treatment and 0% after treatment, and the comparison before and after treatment was statistically significant (P <0.005). The test group was 14.89% before treatment and 6.38% after treatment, and the comparison before and after treatment was statistically significant (P <0.005). Before the experiment, there was no statistical significance in the comparison of blood phosphorus and hyperphosphatemia data between the two groups of patients (P >0.005). The content was statistically significant to none (P >0.005). The change ratio of blood phosphorus in the test group was 13.27±11.49%, and the change ratio of blood phosphorus in the reference group was 26.12±17.419, and the data comparison between the two groups was not statistically significant (P > 0.005). In the comparison of the proportion of hyperphosphatemia, the proportion of the two groups before and after treatment decreased significantly, and the comparison before and after treatment was statistically significant (P <0.005).

Table 2 Comparison results of patient electrolytes

Project	Group	Before treatment	After treatment	T -value	P value	Change ratio (%)
Serum Potassium comparison (x±s, mmol/l)	Reference group	4.23±0.77	3.89±0.52	1.372	0.176	20.39±14.90
	Test group	4.43±0.69	4.42±0.54	-0.227	0.821	15.01±11.06
	T value	-0.421	-2.849	-	-	2.045

	P value	0.671	0.006	-	-	0.034
Project	Group	Before treatment	After treatment	2 -value	P value	-
Percentage of hyperkalemia	Reference group (%)	15.45	0	2.083	0.149	-
	Test group (%)	14.85	6.31	1.771	0.183	-
	T value	0.002	0.867	-	-	-
	P value	0.9545	0.31	-	-	-
Project	Group	Before treatment	After treatment	T -value	P value	Change ratio (%)
Serum Phosphorus (x±s, mmol/l)	Reference group	1.81±0.65	1.39±0.57	2.432	0.027	26.12±17.419
	Test group	1.75±0.75	1.21±0.49	4.878	<0.001	34.92±22.548
	T value	0.365	1.309	-	-	-1.637
	P value	0.71	0.189	-	-	0.107
Project	Group	Before treatment	After treatment	T value	P value	-
Percentage of hyperphosphatemia	Reference group (%)	58.782	23.45	4.769	0.037	-
	Test group (%)	51.02	18.37	11.365	0.001	-
	T value	0.3489	2.084	-	-	-
	P value	0.565	0.153	-	-	-

2.4 Blood routine comparison of postoperative patients

Table 3 is the comparison result of red blood cell and hemoglobin content before and after treatment. Before treatment, the red blood cell content and hemoglobin content of the reference group and the test group were not statistically significant (P >0.005). There was no significant change in red blood cells in the reference group before and after treatment (P >0.005), in the test group it was $3.21\pm0.81\times10^{12}$ /L before treatment, and after treatment it was $2.89\pm0.81\times10^{12}$ /L, and the comparison before and after the data was statistically significant (t =3.315, P =0.002). At the same time, the change ratio of red blood cells in the reference group was 13.75±13.53%, and the change ratio in the test group was 13.81±13.121%, and the comparison between the two groups was not statistically significant (P >0.005). There was no statistical significance in the hemoglobin content of the test group and the reference group before treatment (P >0.005). The comparison was statistically significant (P <0.005), but the hemoglobin in the reference group before and after treatment was not statistically significant (P >0.005).

Table 3 *P*atient blood routine results

*P*roject	Group	Before treatment	After treatment	*T* - value	*P* value	Change ratio (%)
Red blood cell comparison (x±s,×10 ^{12}/l)	Reference group	2.74±0.49	3.06±1.35	-0.913	0.349	13.75±13.53
	Test group	3.21±0.81	2.89±0.81	3.315	0.002	13.81±13.121
	T value	-1.756	0.4862	-	-	-0.05
	P value	0.056	0.659	-	-	0.961
Hemoglobin comparison (x±s, g/l)	Reference group	87.53±17.16	88.42±16.95	0.061	0.978	12.72±11.42
	Test group	96.12±25.73	87.15±21.67	3.354	0.001	13.23±101.51
	T value	-1.346	-0.014	-	-	-0.085
	P value	0.176	0.983	-	-	0.942

2.5 Comparison of treatment physical characteristics

Figure 7 (a) and Figure 7 (b) are the comparison results of the breath of the test group and the reference patient after treatment, respectively, in which the red line is the range of breathing per minute of normal people, which is in the interval of 12 to 20. There was no statistically significant difference between the two groups at 1 hour, 2 hours after treatment and before treatment (P >0.005), and the respiration per minute of the patients in both groups was within the standard index range.

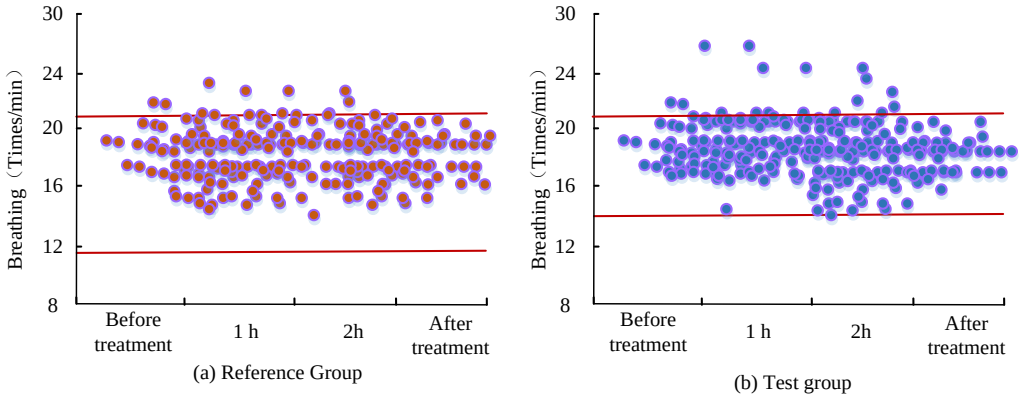


Figure 7 Comparison of two groups for breathing

There was no statistical significance in diastolic blood pressure, mean arterial pressure, systolic blood pressure, and blood pressure compliance rate between the test group and the reference group before treatment (P >0.005*)*. Compared with the reference group, the average arterial pressure and systolic blood pressure of the test group after 2 hours of treatment were higher, and the comparison between the two groups was statistically significant (*P* <0.005). At 1 hour and 2 hours after treatment, the mean arterial pressure, diastolic blood pressure, and systolic blood pressure of the two groups were not statistically significant compared with those before treatment (*P* >0.005). At the same time, in the comparison of blood pressure compliance rate, the reference group had a higher blood pressure compliance rate at 1 hour and after treatment, and the comparison between the two groups was statistically significant (*P* <0.005). There was no statistical significance in the comparison of the blood pressure standard rate between the two groups at 1 hour and 2 hours before treatment (*P* >0.005).

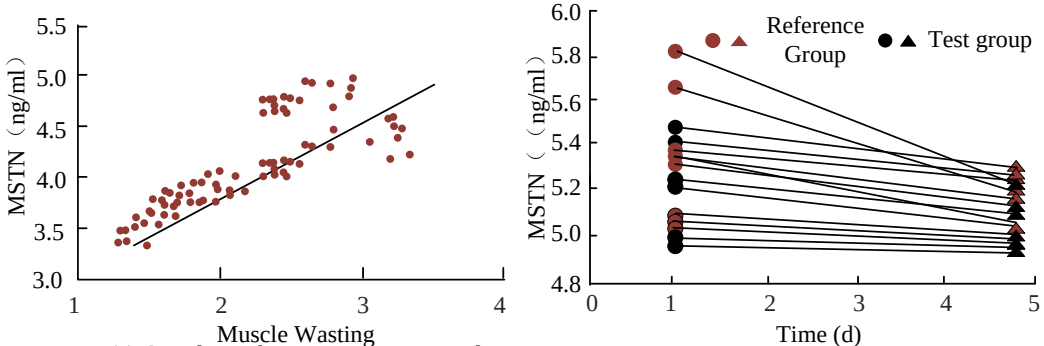
Table 4 Comparison of blood pressure between two groups of patients

Group	Before treatment		Treatment 1h	Treatment 2h	After treatment
Reference group	Systolic blood pressure	151.81±22.75	129.95±27.56	140.11±29.74	140.06±23.11
	Diastolic pressure	86.91±16.57	81.601±15.53	78.71±15.11	85.66±15.72
	Mean arterial Pressure	107.19±15.99	101.75±17.45	98.78±19.066	104.08±18.12
	Blood Pressure compliance rate (%)	37.88	44.41	38.75	44.41
Test group	Systolic blood pressure	156.48±24.6	153.19±23.17	159.71±24.939	156.69±24.69
	Diastolic pressure	87.31±18.57	82.00±14.62	86.09±15.69	83.10±13.69
	Mean arterial pressure	110.38±19.12	105.07±15.86	111.04±16.62	107.84±15.11
	Blood Pressure compliance rate (%)	20	20.00 [1)]	20	20.00 [1)]

Note: 1) Compared with the reference group, $P< 0.05$.

2.6 Myostatin comparison

Figure 8 (a) shows the results of the correlation between myostatin and muscle consumption, in which muscle consumption is divided into 4 grades, 1 to 4, corresponding to general, slight, impact, and severe impact, respectively. It can be seen that MSTN is positively correlated with muscle consumption. Figure 8 (b) is the comparison of MSTN content in patients before and after treatment. Before treatment, the blood MSTN content of patients in the test group and reference group were 5.13 ± 0.24 (ng/ml) and 5.05 ± 0.22 (ng/ml), respectively, after five days of treatment, respectively, it was 4. 65 ± 1.04 (ng/ml) and 4. 85 ± 0.52 (ng/ml), and the comparison between before and after treatment in the test group was statistically significant ($P < 0.05$). There was no statistical significance in the comparison before and after in the reference group (P> 0.05).



(a) Correlation between myostatin and hand muscle consumption

(b) Comparison of MSTN content

Figure 8 Comparison results of muscle growth inhibition MSTN

Discussion

Uremia is a serious kidney injury disease, which will have a serious impact on the life and work of patients as time goes by. Due to impaired kidney function, patients with uremia often experience symptoms such as muscle weakness, soreness, and

depression. Several patients may experience symptoms such as coma, disturbance of consciousness, and tremors. These symptoms are all complications of uremia [15-16]. Uremia patients have impaired kidney function. The kidney is an important metabolic organ of the human body, which can remove harmful toxins from the human body. At the same time, the kidney organ can absorb trace elements needed by the human body, such as sodium ions, amino acids, proteins, etc., to ensure the balance of human system functions [17-19]. Impaired kidney function causes the body to accumulate many metabolites, including urea nitrogen and creatinine. According to medical research, some harmful toxins can affect the human nervous system and hinder the absorption of nutrients in the human body. Among them, urea nitrogen and creatinine are the most important evaluation indicators of human liver function. Uremic patients are affected by the accumulation of toxins, which will affect the permeability of the blood-brain barrier. When the human kidney function declines, it will cause a pressure difference in the human blood-brain barrier, thereby affecting the neurological state of the human body. In modern medicine, uremia cannot be completely cured. In the early physical examination, if there is a problem with the kidney function of the person, it is necessary to see a doctor in time, according to the diagnosis result, to reduce the toxins in the human body. Treatment of uremia mainly includes drug therapy, kidney replacement surgery, and dialysis. The effect of drug therapy is low, and the operation of kidney replacement is limited. Currently, dialysis is the main treatment for uremia [20]. Among them, blood purification dialysis has become one of the main means of treating kidney diseases due to its safety and stability.

Myostatin (MSTN) is one of the transforming growth factors, which is a negative factor for human bone growth and development and has an inhibitory effect on human muscle. In vertebrates, the MSTN in the skeletal muscle is the most abundant. In addition, there are certain MSTN in the fat, mammary gland, and cardiac muscle. In the human body, MSTN exists in the blood in the form of complexes through hydrolysis, and part of MSTN will bind to specific receptors of human cells and appear corresponding biological functions. In the treatment of uremic patients, the content of MSTN in the patient's body increases, which is the main factor leading to sarcopenia in uremic patients. The patient was treated with two dialysis methods, both of which could reduce the MSTN content in the patient's body. The MSTN content of the test group before and after treatment was statistically significant ($P < 0.05$), and the MSTN content of the reference group before and after the experiment was not statistically significant ($P > 0.05$), indicating that continuous blood evolution has an inhibitory effect on the MSTN content of patients, compared with intermittent blood evolution.

There were differences in the treatment techniques used by the two groups of patients. The reference group was treated with indirect dialysis, while the test group was treated with continuous dialysis. In terms of healing time, the test group has a longer blood evolution cycle for patients, more toxin reduction, and better relief for patients. The reference group uses indirect dialysis, which is prone to the risk of exacerbation of the disease during treatment, which has a certain impact on the relief of patients' symptoms. In the comparison of the renal function of the patients, both dialysis schemes can eliminate toxins in the patient's body, but there are differences in the therapeutic effects of the two schemes. After treatment, the blood urea nitrogen and serum creatinine in the reference group were better than those in the test group, and the reference group was better at removing toxins than the test group, and the comparison between the two groups was not statistically significant ($P > 0.05$). The test group was significantly better than the reference group in inhibiting retinol binding protein and cystatin C. In a comprehensive comparison, the test group is better at removing toxins from patients. In medical research, electrolyte imbalance has a significant impact on uremia patients, and has a serious impact on patients' bones and physical fitness. Both treatment regimens can alleviate the phosphorus level of the patients, and the improvement degree of the test group is better than that of the reference group. At the same time, in the routine blood comparison, the hemoglobin in the test group decreased significantly during treatment, which could easily cause anemia in patients. In the comparison of treatment physical characteristics, the two treatment options did not have much impact on the vital characteristics of the patients.

Based on the above analysis, the two treatment options can improve the patient's condition, but there are differences in the treatment effect. The test group is better for the overall treatment of patients, but it is expensive and more suitable for patients with severe uremia. At the same time, some patients will experience symptoms such as nausea, vomiting, and pain during the dialysis process, and it is necessary to choose an appropriate treatment plan according to the patient to meet the patient's treatment needs.

Conclusion: Both schemes can alleviate the condition of uremia patients. Compared with

indirect dialysis, continuous dialysis is more comprehensive, and the patient's remission effect is better within the same treatment time.

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