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Evaluation of the Effectiveness and Efficiency of the Combination of Levamlodipine Besylate and Valsartan in the Treatment of Hypertension

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Abstract: *Objective:* To investigate the effectiveness and efficiency of combining levamlodipine besylate and valsartan in the treatment of hypertension. *Methods:* This study selected 28 patients with hypertension as observation subjects. The treatment duration ranged from January 2020 to June 2023. Using the random number table method, patients were divided into two groups. The control group received treatment with valsartan, while the observation group received a combination of valsartan and levamlodipine besylate. Therapeutic effects and safety were compared between the groups, and changes in the patient's blood pressure and renal function index levels were assessed. *Results:* The total clinical effective rate of the observation group was significantly higher than that of the control group ($P < 0.05$). The observation group demonstrated better diastolic blood pressure, systolic blood pressure, and renal function indicators compared to the control group ($P < 0.05$). There was no significant difference in the incidence of adverse reactions between the two groups ($P > 0.05$). *Conclusion:* The combined treatment of levamlodipine besylate and valsartan in patients with hypertension showed significant clinical efficacy and holds broad application value.

Keywords: Levamlodipine besylate; Valsartan; Hypertension; Renal function; Effective rate

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1. Introduction

In clinical practice, hypertension has emerged as a condition increasingly jeopardizing the physical and mental well-being of patients. This ailment is intricately linked to stroke, cerebral infarction, and other cardiovascular diseases. Untreated, hypertension significantly elevates the risk of cardiovascular complications [1]. Drug treatment stands as a common approach for managing hypertension. However, single-drug therapy presents limitations, particularly in cases of elderly patients with more severe conditions and challenging blood pressure control. Consequently, medical professionals tend to favor combined medication methods in clinical treatment. Through the selection of safe and effective medications and the implementation of long-term treatment, blood pressure in patients can be stabilized within the optimal range.

Levamlopine besylate and valsartan are widely employed in clinical hypertension treatment. They both exhibit prolonged and stable antihypertensive effects without compromising the patient's liver and kidney functions, thereby enhancing therapeutic outcomes [2]. The combination of these two drugs not only delays disease progression but also effectively prevents organ failure, significantly improving patients' lives and health [3]. This article aims to investigate the impact of combining valsartan with levamlodipine besylate in the clinical treatment of hypertension.

2. Materials and methods

2.1. General information

This study included 28 patients with hypertension (from January 2020 to June 2023) as research subjects, categorized into a control group and an observation group using the random number table method. Each group comprised 14 patients.

Control group: There were 8 male patients and 6 female patients in this group. The mean age was 70.69 ± 1.83 years, with a mean disease duration of 5.58 ± 0.79 years. Comorbidities included 6 patients with hyperlipidemia, 5 with diabetes, and 3 with coronary heart disease.

Observation group: There were 10 male patients and 4 female patients in this group. The mean age was 70.86 ± 1.61 years, with a mean disease duration of 5.42 ± 0.55 years. Comorbidities included 6 patients with hyperlipidemia, 8 with diabetes, and 5 with coronary heart disease. The data comparison between the two groups of hypertensive patients showed minimal differences ($P > 0.05$).

Inclusion criteria: Individuals consistent with the diagnostic criteria for hypertension in the 2010 version of "China's Guidelines for the Prevention and Treatment of Hypertension," with no history of other related antihypertensive drug treatment in the past month, hypertension graded 2 or above, and signed the informed consent.

Exclusion criteria: Those with high blood pressure due to other diseases, autoimmune diseases, severe infectious diseases, acute myocardial infarction, liver and kidney dysfunction, and allergic reactions to study-related drugs.

2.2. Methods

Subjects in the control group received treatment with valsartan. The medication was taken orally once a day (morning) at a dosage of 80 mg. The treatment duration was 2 months.

Subjects in the observation group received treatment with levamlodipine besylate and valsartan. The dosage and usage of valsartan were consistent with the control group. Levamlodipine besylate was taken orally once a day at 5 mg, in the morning. After one week, if blood pressure control was unsatisfactory, the dosage could be increased to 10 mg once a day. The treatment duration was 2 months.

2.3. Observation indicators

(1) Clinical efficacy and adverse reactions analysis: Analyze the clinical efficacy and occurrence of adverse reactions (such as dizziness, headache, nausea, and lethargy) between groups. Express the clinical efficacy using the total clinical effectiveness rate, which is the sum of the markedly effective rate and effective rate. Markedly effective: The patient's systolic and diastolic blood pressure is below 140 mmHg and 90 mmHg after treatment, with no impact on daily life. Effective: The patient's systolic and diastolic blood pressure is maintained at 140–150 mmHg and 90 mmHg, or the blood pressure level drops by more than 20 mmHg compared to before treatment. Ineffective: The blood

pressure level after treatment drops below 10 mmHg compared to before treatment [4].

(2) Blood pressure level changes analysis: Analyze changes in blood pressure levels between groups. Use a mercury sphygmomanometer to measure diastolic and systolic blood pressure before and after treatment.

(3) Renal function index improvement observations: Observe the improvement of renal function index levels between the two groups. Collect fasting venous blood from patients before and after treatment, and measure creatinine, hemoglobin, albumin, and urea nitrogen levels.

2.4. Statistical processing

SPSS 22.0 was used for relevant statistical analyses. Count-related data were expressed as percentages (%), and the χ^2 test was employed for statistical analysis of results. Measurement-related data were expressed as mean ± standard deviation (SD), and the *t*-test was employed, with $P < 0.05$ considered statistically significant.

3. Results

3.1. Comparison of clinical efficacy between groups

The data in **Table 1** and **Figure 1** show that the total clinical effective rate of the observation group was 100.00%, which was significantly higher than the control group (71.43%; $P < 0.05$).

Table 1. Comparison of clinical efficacy between groups

Group	Markedly effective (*n*)	Effective (*n*)	Ineffective (*n*)	Overall clinical effectiveness (%)
Control group ($n = 14$)	4	6	4	71.43
Observation group ($n = 14$)	6	8	0	100.0
χ^2	-	-	-	4.667
P	-	-	-	0.031

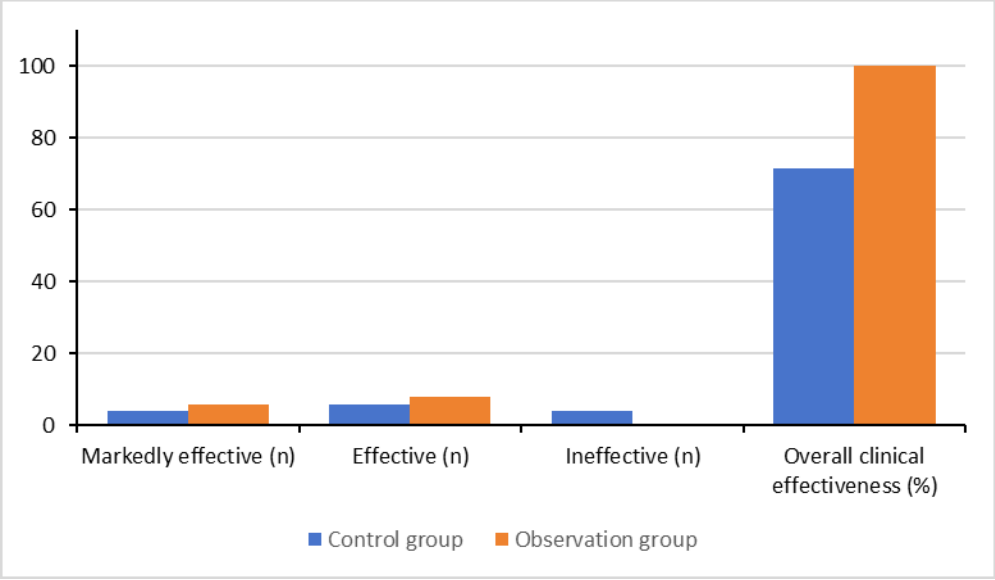

Figure 1. Comparison of clinical efficacy between groups

3.2. Comparison of blood pressure and renal function index levels between groups

Table 2 and **Figure 2** show that there were minimal differences in the levels of diastolic blood pressure, systolic blood pressure, and renal function indicators between the groups before medication ($P > 0.05$). Following medication, the observation group had significantly lowered diastolic and systolic blood pressure levels as well as the urea nitrogen and creatinine levels as compared to those of the control group ($P < 0.05$), whereas the levels of hemoglobin and albumin were higher than those of the control group ($P < 0.05$).

Table 2. Comparison of blood pressure and renal function index levels between groups before and after treatment (mean ± SD)

Indicators	Treatment	Control group (n = 14)	Observation group (n = 14)	t	P
Diastolic blood pressure (mmHg)	Before	105.73 ± 5.85	105.96 ± 5.41	0.108	0.915
	After	88.21 ± 3.06	81.03 ± 2.85	6.425	0.001
Systolic blood pressure (mmHg)	Before	154.79 ± 5.92	154.83 ± 5.79	0.018	0.986
	After	130.56 ± 4.43	125.01 ± 4.16	3.417	0.002
Urea nitrogen (mmol/L)	Before	30.81 ± 2.32	30.96 ± 2.48	0.165	0.870
	After	27.96 ± 1.41	20.29 ± 1.08	16.158	0.001
Creatinine (μmol/L)	Before	476.28 ± 33.94	476.52 ± 33.89	0.019	0.985
	After	450.13 ± 16.95	351.96 ± 10.28	18.529	0.001
Hemoglobin (g/L)	Before	64.79 ± 2.93	64.53 ± 2.68	0.245	0.808
	After	75.03 ± 3.76	90.85 ± 4.48	10.121	0.001
Albumin (g/L)	Before	35.96 ± 2.54	35.71 ± 2.49	0.263	0.795
	After	41.31 ± 3.79	45.98 ± 4.46	2.985	0.006

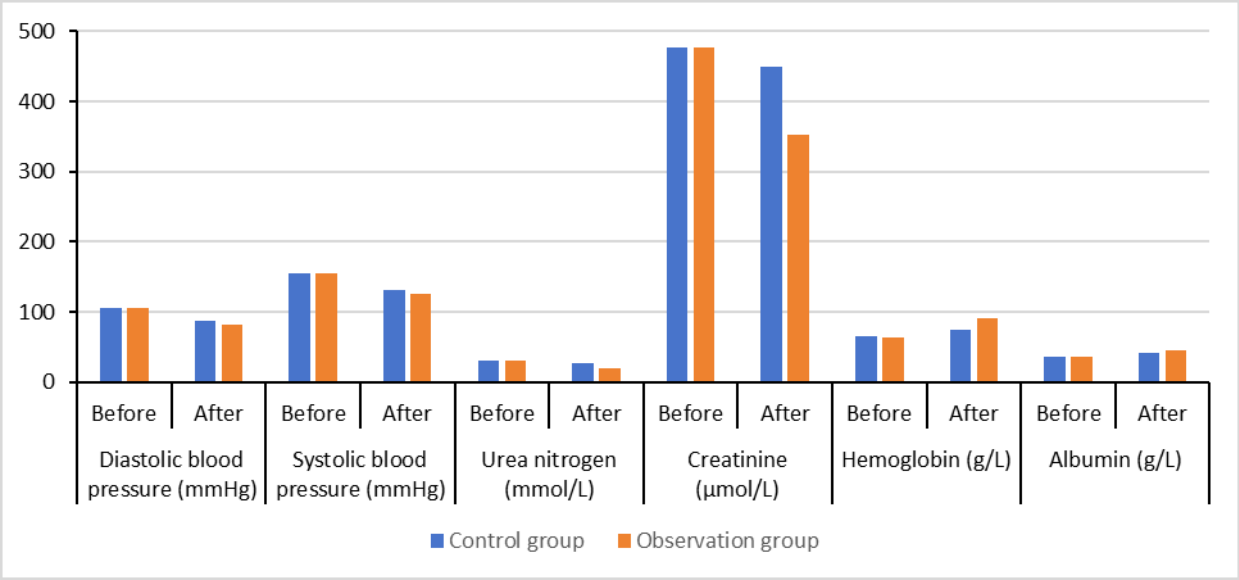

Figure 2. Comparison of blood pressure and renal function indicators between groups

3.3. Comparison of adverse reaction rates between groups

It can be seen from **Table 3** and **Figure 3** that the incidence of adverse reactions in the observation group was not significantly different from that in the control group ($P > 0.05$).

Table 3. Comparison of adverse reactions between groups

Group	Dizziness (*n*)	Headache (*n*)	Nausea (*n*)	Lethargy (*n*)	Total (%)
Control group (*n* = 14)	2	1	2	0	35.71
Observation group (*n* = 14)	2	1	2	1	42.86
χ^2	-	-	-	-	0.150
P	-	-	-	-	0.699

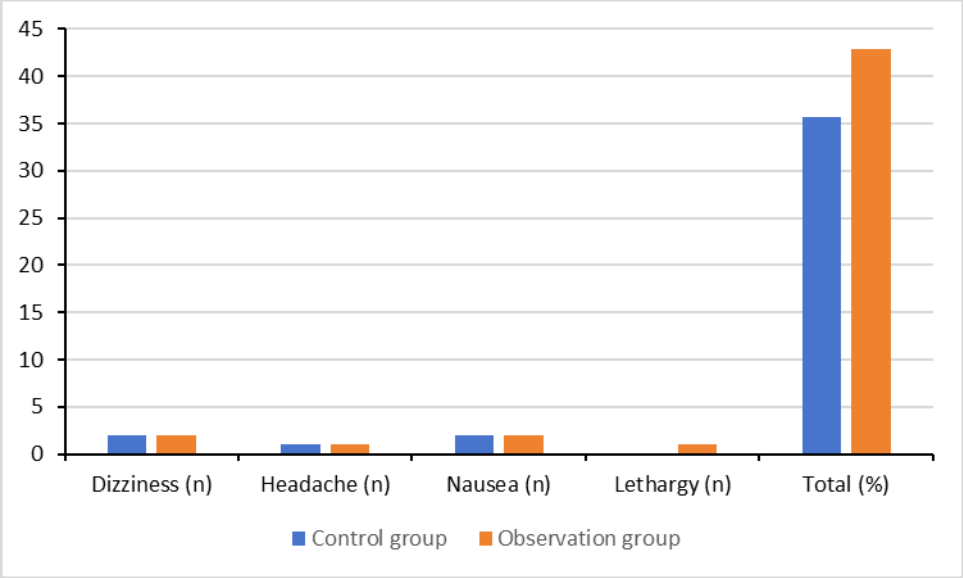

Figure 3. Comparison of adverse reaction rates between groups

4. Discussion

Hypertension is a chronic disease with extremely high clinical incidence. Its pathogenesis is complex and involves neural regulation, humoral regulation, vascular regulation, and genetic factors. Prolonged high blood pressure can cause the heart to be overloaded, which can easily lead to heart disease, heart failure, and other cardiovascular conditions. Simultaneously, high blood pressure can damage the patient's cerebral blood vessels and increase the risk of stroke [5]. In addition, prolonged high blood pressure can also lead to a decrease in glomerular filtration rate, impaired renal tubular function, and ultimately renal insufficiency [6].

Valsartan is a commonly used clinical drug for the treatment of hypertension. It is an angiotensin II receptor antagonist that blocks angiotensin II receptors and reduces the activity of angiotensin II, dilating blood vessels and lowering blood pressure. This drug can effectively lower blood pressure in patients with hypertension by dilating blood vessels, reducing peripheral resistance, and reducing cardiac load, thereby lowering blood pressure levels. Additionally, valsartan can reduce cardiac load and improve cardiac function. Furthermore, valsartan can protect kidney function and reduce kidney damage by lowering blood pressure and glomerular filtration pressure to protect the kidneys from damage. However, it isn't easy to achieve the desired effect with a single drug [7].

The mechanism of action of levamlodipine besylate is to inhibit the entry of calcium ions into cardiomyocytes and smooth muscle cells, thereby reducing vascular tone, dilating blood vessels, reducing cardiac load, and lowering blood pressure. Its mechanism involves blocking L-type calcium channels [8].

The combination of levamlodipine besylate and valsartan in the treatment of hypertension can improve the therapeutic outcomes. Clinically relevant studies have shown that levamlodipine besylate and valsartan can significantly reduce blood pressure [9]. Since the two drugs have different mechanisms of action, they can work simultaneously in different links, thereby achieving better antihypertensive effects.

The research results showed that the total clinical effective rate of the observation group was significantly higher than that of the control group, and the levels of blood pressure and renal function indicators were significantly better than those of the control group ($P < 0.05$). This indicated that the combined medication regimen can significantly improve the disease control effect of patients with hypertension and promote the improvement of their renal function. Analyzing the reasons, the combined use of levamlodipine besylate and valsartan can exert complementary antihypertensive effects. Levamlodipine besylate lowers blood pressure by dilating blood vessels, while valsartan reduces glomerular filtration pressure and tubular reabsorption to improve renal function [10]. The combined application of the two can simultaneously lower blood pressure and improve kidney function, thereby more effectively controlling hypertension patients' condition. In addition, levamlodipine besylate and valsartan target calcium channels and angiotensin II, respectively, which can make up for the shortcomings of single-drug treatment [11]. A variety of factors usually cause elevated blood pressure in hypertensive patients, and it is difficult to control blood pressure with a single drug completely. The combined use of levamlodipine besylate and valsartan can act on different targets simultaneously to achieve a more comprehensive blood pressure control.

In summary, the combination of levamlodipine besylate and valsartan significantly treats hypertension and is suitable for widespread use.

Disclosure statement

The author declares no conflict of interest.

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