

Effectiveness of Atorvastatin Combined with Trimetazidine in the Treatment of Coronary Heart Disease in the Elderly and Their Effect on Cardiac Function

Fan Yang*

People's Liberation Army Dalian 10th Separation Cadre Recreation Center, Liaoning Military Region, Dalian 116000, Liaoning, China

*Corresponding author: Fan Yang, chengru.1985@163.com

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Abstract: *Objective:* To analyze the effect of atorvastatin combined with trimetazidine in the treatment of elderly coronary artery disease and the effect on patients' cardiac function. *Methods:* 60 cases of elderly coronary artery disease patients were divided into 2 groups by randomization method, and all of them received conventional symptomatic treatment, while atorvastatin was added to the control group and trimetazidine was combined with atorvastatin in the observation group, and the clinical indexes were compared. *Results:* After treatment, the angina attack, cardiac function indexes, and inflammatory factor levels of the observation group were better than those of the control group ($P < 0.05$), and the differences in adverse reactions between the two groups were not significant ($P > 0.05$). *Conclusion:* Combined treatment of coronary heart disease in the elderly with atorvastatin and trimetazidine can positively reduce angina symptoms, improve cardiac function, and reduce inflammatory reactions, and the effect is definite.

Keywords: Coronary heart disease in the elderly; Atorvastatin; Trimetazidine; Cardiac function

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1. Introduction

Coronary heart disease is a clinical syndrome characterized by an increased oxygen demand of the myocardium, accompanied by an insufficient coronary blood supply. This imbalance results in myocardial hypoxia and ischemia, leading to angina pectoris and other related symptoms. The development of the disease is influenced by factors such as daily diet, lifestyle, and age^[1]. For middle-aged and elderly individuals, who have a higher incidence of the disease, failing to promptly control the condition can cause irreversible damage to the heart. The clinical treatment of coronary artery disease focuses on symptom control, as there is no specific drug for the disease^[2]. Atorvastatin and trimetazidine are commonly used in treatment. To analyze the effectiveness of their combination, this study included a total of 60 patients.

2. Materials and methods

2.1. General information

A total of 60 elderly patients with coronary artery disease were recruited between January 2022 and December 2023 and randomly divided into two groups using the randomization method, with 30 cases in each group.

Control group: 19 males, 11 females, age 89–95 years (mean: 92.10 ± 2.38 years); disease duration 11–22 years (17.20 ± 3.23 years).

Observation group: 20 male cases, 10 female cases, age 90–95 years (92.26 ± 2.07 years); disease duration 11–21 years (17.02 ± 3.14 years).

The general information of the two groups was comparable ($P > 0.05$).

2.2. Inclusion and exclusion criteria

- (1) Inclusion criteria: (a) meet the clinical diagnostic criteria of coronary heart disease, age ≥ 60 years; (b) meet the relevant indications for medication; (c) no serious cardiovascular adverse events at the time of enrollment; (d) complete clinical information data.
- (2) Exclusion criteria: (a) combined with immune system diseases, hematologic diseases, or infectious diseases; (b) combined with malignant tumors; (c) combined with psychiatric diseases; (d) allergic to any of the drugs used in this study.

2.3. Methods

Both groups of patients were treated with conventional symptomatic treatment, using β -blockers, aspirin/clopidogrel, and other drugs, as a basis. The control group received oral atorvastatin calcium tablets, 20 mg once a day, with the dose increased to no more than 80 mg/day depending on the condition. The observation group received trimetazidine in addition to atorvastatin. The dosage of atorvastatin was similar to the control group, while oral trimetazidine tablets were given at (concentration and dosage) per day. The control group and observation group were treated continuously for eight weeks.

2.4. Observation indexes

- (1) Compare the angina attacks before and after treatment, including the frequency and duration of the attack.
- (2) Compare the cardiac function indexes of the two groups, including LVEF (left ventricular ejection fraction) and LVEDD (left ventricular end-diastolic internal diameter).
- (3) Compare the levels of inflammatory factors, including intercellular adhesion molecule (ICAM-1), interleukin-18 (IL-18), and interleukin-6 (IL-6) which were measured using enzyme-linked immunosorbent assay (ELISA).
- (4) Compare adverse drug reactions, including dizziness, fatigue, nausea and vomiting.

2.5. Statistical analysis

The data were analyzed using SPSS version 25.0 statistical software. The measurement data conformed to a normal distribution were expressed as mean \pm standard deviation (SD) and analyzed using the *t*-test, while count data were expressed as [*n* (%)] and analyzed using the χ^2 test. A *P*-value of less than 0.05 indicated a statistically significant difference.

3. Results

3.1. Angina attack

As shown in **Table 1**, the difference in angina attacks between the two groups of patients before treatment was not obvious ($P > 0.05$), but after treatment, the frequency of angina attacks in the observation group was lower and the duration was shorter as compared to the control group ($P < 0.05$).

Table 1. Angina attack situation (mean \pm SD)

Group	Cases (n)	Frequency of episodes (episodes/week)		Duration (min/episode)	
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Control group	30	7.63 \pm 1.12	3.08 \pm 0.45	8.89 \pm 1.23	2.96 \pm 0.24
Observation group	30	7.58 \pm 1.27	2.19 \pm 0.39	8.94 \pm 1.18	2.10 \pm 0.30
<i>t</i>	-	0.162	8.186	0.161	12.261
<i>P</i>	-	0.872	0.000	0.873	0.000

3.2. Cardiac function indexes

As shown in **Table 2**, the difference between the data of cardiac function indexes of the two groups before treatment is not significant ($P > 0.05$), and the LVEF of the observation group is higher than that of the control group after treatment, and the LVEDD is lower than that of the control group ($P < 0.05$).

Table 2. Cardiac function indexes (mean \pm SD)

Group	Cases (n)	LVEF (%)		LVEDD (mm)	
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Control group	30	40.52 \pm 3.35	46.17 \pm 3.24	58.25 \pm 3.31	52.14 \pm 2.29
Observation group	30	40.48 \pm 3.16	49.14 \pm 3.18	58.17 \pm 3.06	48.16 \pm 2.21
<i>t</i>	-	0.048	3.583	0.097	6.850
<i>P</i>	-	0.962	0.001	0.923	0.000

3.3. Inflammatory factor levels

As shown in **Table 3**, the levels of inflammatory factors were higher in both groups before treatment ($P > 0.05$), and the levels of each inflammatory factor after treatment were lower in the observation group than in the control group ($P < 0.05$).

Table 3. Inflammatory factor levels (mean \pm SD)

Group	Cases (n)	ICAM-1 (pg/mL)		IL-18 (ng/mL)		IL-6 (pg/mL)	
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Control group	30	171.52 \pm 18.36	141.05 \pm 15.36	10.18 \pm 1.19	6.15 \pm 1.34	19.25 \pm 3.18	9.20 \pm 1.16
Observation group	30	170.95 \pm 17.46	121.45 \pm 14.18	10.30 \pm 1.15	3.91 \pm 0.98	19.17 \pm 3.24	6.61 \pm 1.14
<i>t</i>	-	0.123	5.135	0.397	7.390	0.097	8.722
<i>P</i>	-	0.902	0.000	0.693	0.000	0.923	0.000

3.4. Adverse drug reactions

As shown in **Table 4**, the differences in adverse drug reactions between the two groups were not significant ($P > 0.05$).

Table 4. Adverse drug reactions [n (%)]

Group	Cases (n)	Dizziness	Fatigue	Nausea and vomiting	Total
Control group	30	1 (3.33)	1 (3.33)	1 (3.33)	3 (10.00)
Observation group	30	1 (3.33)	1 (3.33)	2 (6.67)	4 (13.33)
χ^2	-	-	-	-	0.162
P	-	-	-	-	0.688

4. Discussion

Coronary heart disease has a very high incidence among middle-aged and elderly individuals, leading to various adverse symptoms such as recurrent angina. Common risk factors for coronary heart disease include smoking, hypertension, hyperlipidemia, and diabetes mellitus [3]. Timely treatment is crucial, as the disease can cause serious cardiovascular events if left unchecked. The clinical treatment of coronary heart disease typically involves a combination of multiple drugs. Atorvastatin, an HMG-CoA reductase inhibitor, works by inhibiting the conversion of HMG-CoA to mevalonate, thus reducing cholesterol synthesis [4]. Additionally, atorvastatin protects myocardial function and has anti-inflammatory and lipid-lowering effects [5]. However, the efficacy of a single drug dose is often insufficient.

Trimetazidine improves coronary and circulatory blood flow, reduces vascular resistance, facilitates myocardial energy production, and promotes myocardial metabolism [6]. It also helps regulate the balance of myocardial oxygen supply and demand, reducing myocardial oxygen consumption, improving myocardial hypoxia and ischemia, and protecting cardiomyocytes from damage [7]. The study results show that patients in the observation group experienced better angina relief and cardiac function improvement compared to the control group. This suggests that the combination of trimetazidine and atorvastatin can more effectively alleviate angina symptoms and enhance cardiac function in patients with coronary heart disease.

The development of coronary heart disease is accompanied by an inflammatory response and is related to coronary atherosclerosis. Inflammation is a major cause of coronary artery atherosclerosis, with adhesion molecules playing a role in cellular response and signal transformation [8,9]. ICAM-1, an adhesion molecule, increases in response to inflammatory factors, leading to vascular remodeling and accelerated disease progression in coronary heart disease [10]. IL-18, a pro-inflammatory factor, induces the proliferation and migration of coronary smooth muscle cells, while IL-6, another inflammatory factor, is a key indicator of atherosclerosis progression [11,12]. Data show that the levels of these inflammatory factors were lower in the observation group after treatment, indicating that the combination therapy effectively controls inflammatory reactions and improves the condition of coronary heart disease.

The comparison of adverse drug reactions between the two groups revealed no significant differences, demonstrating that the addition of trimetazidine not only enhances treatment efficacy but also has minimal impact on side effects.

In conclusion, the combination of atorvastatin and trimetazidine is an effective treatment for coronary heart disease in the elderly, significantly improving cardiac function with few adverse effects. This treatment approach is highly recommended.

Disclosure statement

The author declares no conflict of interest.

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