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Investigation of The Effect of Ticagrelor Combined with Alprostadil in The Treatment of Angina Pectoris in Coronary Artery Disease

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Abstract

Objective To take the treatment of angina pectoris in coronary artery disease with Ticagrelor combined with Alprostadil and observe the actual treatment effect. Methods One hundred and six patients with angina pectoris of coronary heart disease admitted to our hospital between June 2021 and June 2022 were randomly divided into a study group and a control group, 53 cases each. The control group was treated with Alprostadil, and the study group was treated with Ticagrelor on this basis. The total effective rate, angina attack frequency, LVEF, LVESD, and LVEDD levels were compared between the two groups. Results The total effective rate was higher in the study group (94.34%) compared to the control group (81.13%) (P<0.05). After treatment, the frequency of angina attacks decreased significantly in both groups, but the frequency of attacks was lower in the study group (P<0.05). LVEF and LVESD increased and LVEDD decreased in both groups, but LVEF and LVESD were higher in the study group than in the control group (P<0.05), while LVEDD was lower in the study group than in the control group (P<0.05). Conclusion The overall effect of Ticagrelor combined with Alprostadil in the treatment of angina pectoris in coronary heart disease is superior, which can further relieve patients' symptoms, reduce the frequency of angina pectoris attacks, and improve cardiac function.

Keywords

Ticagrelor; Alprostadil; Angina pectoris in coronary artery disease.

1. INTRODUCTION

Angina pectoris is a common type of coronary heart disease with a high incidence. The main clinical manifestations are chest tightness and crushing chest pain, which is mostly located behind the sternum and may radiate to the left upper limb and the precordial region. Angina is likely to attack when the patient is agitated or undergoes strenuous exercise [1]. If the angina is not effectively controlled, it may develop into myocardial infarction or heart failure, which affects the life safety of patients. Currently, the clinical treatment of myocardial infarction in coronary heart disease is mainly by pharmacological means. The commonly used nitrates and statins are able to work, but their long-term effects are less satisfactory [2]. Alprostadil is a prostaglandin drug that can dilate blood vessels and has an inhibitory effect on platelet aggregation, while protecting vascular endothelial cell function. Ticagrelor, on the other hand, is a novel P2Y12 receptor antagonist that inhibits platelet aggregation and suppresses the inflammatory response [3]. We treated 53 patients with unstable coronary angina admitted between June 2021 and June 2022 with Ticagrelor combined with Alprostadil and report the following.

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2. MATERIAL AND METHOD

2.1. Basic information

One hundred and six patients with coronary angina admitted to our hospital between June 2021 and June 2022 were randomly divided into a study group and a control group of 53 patients each. The selected individuals met the diagnostic criteria of the Internal *Medicine* on unstable coronary angina [4], and informed consent was obtained from the patients for this study. Exclusion of those with cognitive impairment or mental abnormalities; those with drug allergies; those with severe insufficiency of other organs such as liver and kidney; those with hematologic and immunologic system diseases. There was no significant difference (P>0.05) in the comparison of basic information between the two groups, as shown in Table 1 below.

Table 1. Comparison of basic information between the two groups

Group	Male/Female (Number)	Age ($\bar{x}\pm s$, year)	Course of disease ($\bar{x}\pm s$, year)
Study group (n=53)	29/24	64.67±5.67	4.89±1.33
Control group (n=53)	30/23	63.23±5.34	4.72±1.26
χ^2/t	0.038	1.346	0.676
P	0.845	0.182	0.501

2.2. Method

Patients in both groups were treated routinely after admission, with absolute bed rest, cardiac monitoring, low-flow oxygenation, and conventional drugs (aspirin, nitroglycerin, etc.). The control group was treated with Alprostadil (National Drug Administration H10980024, manufacturer: Beijing Tide Pharmaceutical Co., Ltd., specification: 2ml: 10μg), 2ml of Alprostadil diluted with 100ml of 0.9% sodium chloride injection, intravenous drip, 1 time/d, for 4 weeks. The study group was treated with Ticagrelor (State Drug Administration H20217033, manufacturer: AstraZeneca Pharmaceutical Co., Ltd., specification: 90mg/tablet), orally, 90mg/time, 1 time/d, for 4 weeks.

2.3. Observed indicators

The total efficiency of treatment was compared between the two groups. Significant effect: no symptoms such as chest pain and normalization of ECG ST-T. Effective: significant relief of chest pain and other symptoms, significant decrease in the frequency and number of episodes, and recovery of ECG ST-T by more than 30%. Ineffective: no significant changes in related symptoms and ECG findings [5]. Total effective rate = (effective + effective) / total effective rate * 100%. Comparing the frequency of angina attacks before and after treatment between the two groups of patients. The left ventricular ejection fraction (LVEF), left ventricular end-systolic dimension (LVESD), and left ventricular end-diastolic dimension (LVEDD) were compared between the two groups.

2.4. Statistical analysis

Data were analyzed using SPSS 22.0 software. The measurement and count data were described as ($\bar{x}\pm s$) and n(%), respectively. Then, t and χ^2 tests were performed. $p<0.05$ indicates that the difference is statistically significant.

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3. RESULTS

3.1. Comparison of efficacy between the two groups

The total effective rate was higher (P<0.05) in the study group (94.34%) compared to the control group (81.13%), as shown in Table 2 below.

Table 2. Comparison of total effective rate between two groups

Group	Significant effect	Effective	Ineffective	Total effective rate [n(%)]
Study group (n=53)	38	12	3	50(94.34)
Control group (n=53)	30	13	10	43(81.13)
$\chi 2$				4.296
P				0.038

3.2. Frequency of angina attacks before and after treatment in both groups

Before treatment, there was no significant difference in the frequency of angina attacks comparing the two groups (P>0.05). After treatment, the frequency of angina attacks decreased significantly in both groups, but was lower in the study group (P<0.05), as shown in Table 3 below.

Table 3. Comparison of frequency of angina pectoris in the two groups ($\bar{x}$±s, times/week)

Group	Before treatment	After treatment
Study group (n=53)	6.06±2.23	2.26±1.13*
Control group (n=53)	6.25±2.05	3.78±1.35*
t	0.456	6.285
P	0.649	<0.001

Note: Comparison with pre-treatment, *P<0.05.

3.3. LVEF, LVESD, and LVEDD in both groups

Before treatment, there was no significant difference in LVEF, LVESD and LVEDD levels between the two groups (P>0.05). After treatment, LVEF and LVESD increased and LVEDD decreased in both groups. However, LVEF and LVESD in the study group were higher than those in the control group (P<0.05), while LVEDD in the study group was lower than that in the control group (P<0.05), as shown in Table 4 below.

Table 4. Comparison of LVEF, LVESD and LVEDD between the two groups ($\bar{x}$±s)

Group	LVEF (%)		LVESD (mm)		LVEDD (mm)	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Study group (n=53)	33.32±5.67	47.68±6.22*	31.23±4.07	38.32±4.66*	59.78±5.43	50.23±4.27*
Control group (n=53)	33.67±5.78	42.23±5.98*	31.45±4.13	35.12±4.31*	60.23±5.78	54.11±4.78*
t	0.314	4.598	0.276	3.670	0.413	4.407
P	0.754	<0.001	0.783	<0.001	0.680	<0.001

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4. DISCUSSION

Unstable coronary angina is a common clinical cardiovascular disease. The main clinical manifestations of patients are chest pain, chest tightness and other symptoms. Clinical treatment is mainly through pharmacological modalities. Among them, antiplatelet aggregation is the main method for the treatment of unstable coronary angina [6]. For example, aspirin inhibits arachidonic acid and cyclooxygenase, thereby blocking the synthesis of thromboxane A2 and thus exerting an antiplatelet effect. Combined with nitroglycerin, nitric oxide is released to promote vasodilation, reduce preload, and lower ventricular end-diastolic pressure and volume to control the patient's condition. However, some patients taking these drugs may experience drug resistance and the actual efficacy may be limited [7-8].

In the present study, the study group was treated with Ticagrelor combined with Alprostadil. The results showed that the total effective rate in the study group was higher than that in the control group ($P<0.05$), and the frequency of angina attacks in the study group was lower than that in the control group after treatment ($P<0.05$), which was similar to the results reported by Cuiying Liu et al. [9]. This indicates that the treatment of angina pectoris in coronary artery disease with Ticagrelor combined with Alprostadil can further relieve patients' symptoms and reduce the frequency of angina attacks. Alprostadil is widely used in the treatment of angina pectoris, which can expand blood vessels, eliminate free radicals, and improve microcirculation in the body. Alprostadil increases coronary blood flow, thus relieving ischemia and hypoxia in cardiomyocytes, while inhibiting vascular smooth muscle proliferation and exerting a hypolipidemic and atherosclerotic effect [10]. Ticagrelor, a novel P2Y12 receptor antagonist, has a significantly stronger anti-platelet aggregation effect than aspirin and can block the synthesis of membrane glycoprotein complexes and adenosine diphosphate receptors, thereby inhibiting platelet activation and aggregation [11]. At the same time, Ticagrelor increases extracellular adenosine concentration, promotes vasodilation, and has anti-inflammatory and myocardial protective effects. Since Ticagrelor itself is an active substance, it is not affected by the hepatic enzyme cytochrome P450 in the 2C19 gene, has a higher bioavailability, has fewer side effects, and has a more desirable safety profile for dosing. After treatment, LVEF and LVESD in the study group were higher than those in the control group ($P<0.05$), while LVEDD in the study group was lower than that in the control group ($P<0.05$), similar to the results reported by Lin Li. This reflects that the combination of Ticagrelor with Alprostadil can produce a synergistic effect to further improve cardiac function and control the progression of the disease [12].

In conclusion, the treatment of angina pectoris in coronary artery disease with Ticagrelor combined with Alprostadil can further relieve patients' symptoms, reduce the frequency of angina attacks, improve cardiac function, and have better overall efficacy.

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