

Effect of Metoprolol on Cardiac Function and Prognosis in Patients with Dilated Cardiomyopathy

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Abstract: Objective: To investigate the effect of metoprolol on cardiac function and prognosis in patients with dilated cardiomyopathy. **Methods:** 100 patients with dilated cardiomyopathy treated in our hospital from January 2018 to December 2019 were randomly divided into control group ($n = 50$) and observation group ($n = 50$). The control group was treated with conventional methods, and the observation group was treated with conventional methods and metoprolol for 6 months. The cardiac function [left ventricular ejection fraction (LVEF), stroke volume (SV), cardiac output (CO)] and prognosis [Glasgow Outcome Scale (GOS) score] of the two groups before and at the end of 6 months of intervention were compared, and the incidence of adverse reactions of the two groups were compared. **Results:** After 6 months of treatment, the levels of LVEF, SV and CO in the two groups were higher than before treatment, and the comparison level between the observation group and the control group was higher, the difference was statistically significant ($P < 0.05$); After 6 months of treatment, the GOS score of the observation group was higher than that of the control group, and the difference was statistically significant ($P < 0.05$); There was no significant difference in the total incidence of adverse reactions between the two groups ($P > 0.05$). **Conclusion:** Metoprolol can improve the cardiac function and prognosis of patients with dilated cardiomyopathy, without increasing the incidence of adverse reactions.

Keywords: Dilated cardiomyopathy; Metoprolol; Heart function; Prognosis

Publication date: March, 2021

Publication online: 31 March, 2021

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The detailed etiology of dilated cardiomyopathy is still unclear, and most of them are related to infection, endocrine abnormalities, genetic factors and so on. At present, there is no specific treatment for dilated cardiomyopathy, and most of them are treated according to the causes to improve the cardiac function and prognosis of patients. In the past, furosemide, perindopril and digoxin were mainly used in the treatment of dilated cardiomyopathy, which can improve the cardiac function and prognosis of patients to a certain extent, but there are still some patients whose improvement effect is not significant. Metoprolol is a beta blocker, which can prevent myocardial ischemia and improve cardiac morphology. It is speculated that metoprolol may have a better effect in dilated cardiomyopathy. In view of this, this study is to explore the effect of metoprolol on cardiac function and prognosis of patients with dilated cardiomyopathy. The details are as follows.

1 Material and methods

1.1 General information

With the approval of the hospital ethics committee, 100 patients with dilated cardiomyopathy treated in our hospital from January 2018 to December 2019 were selected and randomly divided into control group ($n = 50$) and observation group ($n = 50$). In the control group, there were 25 males and 25 females, aged 50-74 years, with an average of (60.96 ± 3.24) years; New York Heart Association classification (NYHA) There were 21 cases of grade II, 19 cases of

grade III and 10 cases of grade IV; Type of disease: There were 23 primary cases and 27 secondary cases. In the observation group, there were 27 males and 23 females, aged 51-73 years, with an average of (61.29 ± 3.22) years; NYHA classification: There were 22 cases of grade II, 20 cases of grade III and 8 cases of grade IV; Type of disease: 22 cases were primary and 28 cases were secondary. The general data of the two groups were comparable ($P > 0.05$). The patient signed the consent voluntarily.

1.2 Inclusion criteria

(1) Inclusion criteria: Dilated cardiomyopathy was in accordance with the relevant diagnostic criteria of "recommendations for diagnosis and treatment of cardiomyopathy"; The compliance was high; The liver and kidney function were normal.

(2) Exclusion criteria: Study drug allergy; Combined with other types of heart disease or cardiomyopathy; Complicated with hematological diseases; There are mental disorders.

1.3 Method

1.3.1 The control group

Routine treatment: Furosemide tablets (Shanghai Zhaohui Pharmaceutical Co., Ltd., approval number: Guoyao Zhunzi h31021074, specification: 20mg) 20mg / time, once a day; Oral perindopril tablets (Servier Tianjin Pharmaceutical Co., Ltd., approval number: Guoyao Zhunzi H20034053, specification: 4 mg) 4mg / time, once a day; Oral digoxin tablets (Chengdu rongruichang Pharmaceutical Co., Ltd., approval number: Guoyao Zhunzi H51021112), specification: 25 mg / time, once daily.

1.3.2 The observation group

On the basis of the control group, the observation group was given metoprolol tartrate sustained-release tablets (Jiangsu chenpai Pharmaceutical Group Co., Ltd., approval number: Guoyao Zhunzi H20064784, specification: 100 mg) 100 mg / time, once a day. Both

groups were treated for 6 months.

1.4 Evaluation index

(1) cardiac function. Before treatment and at the end of 6 months of treatment, the whole heart function hemodynamics detection and analysis system (Changsha Xiongfei science and Technology Industry Co., Ltd., model: Left ventricular ejection fraction (LVEF), stroke volume (SV) and cardiac output (CO) were measured in the two groups. (2) Prognosis: Glasgow Outcome Scale (GOS) was used to evaluate the prognosis of the two groups before treatment and at the end of 6 months of treatment^[2]. The score range of 1-5 points indicated that the prognosis of the two groups was good from death to recovery. The higher the score, the better the prognosis of the patients. (3) Adverse reactions were as follows. The incidence of insomnia, headache and vertigo were recorded.

1.5 Statistical methods

SPSS 25.0 software was used for data processing. ($\bar{x} \pm s$) was used to represent cardiac function index, age and GOS score. Independent sample t test was used for comparison between groups, and paired sample t test was used for comparison within groups; NYHA, gender, disease type and incidence of adverse reactions were expressed by percentage, and the difference was statistically significant by χ^2 test ($P < 0.05$).

2 Results

2.1 Cardiac function

There was no significant difference in the levels of CO, LVEF and SV between the two groups before treatment ($P > 0.05$). After 6 months of treatment, the levels of the above indicators in the two groups were higher than before treatment, and the comparison level between the observation group and the control group was higher, the difference was statistically significant ($P < 0.05$). See Table 1.

Table 1. Comparison of cardiac function indexes between the two groups before and after treatment ($\bar{x} \pm s$)

	Group	LVEF/%	SV / (ML • time ⁻¹)	Co / (ML • Time ⁻¹)
time	Control group (n = 50)	34.10±3.22	34.41±4.23	3.21±0.72
	<i>t</i>	0.928	0.334	0.496
	<i>P</i>	0.356	0.739	0.621
The treatment lasted for 6 months	Observation group (n = 50)	48.34±4.35 ^a	52.23±4.63 ^a	5.38±1.04 ^a
	Control group (n = 50)	39.57±4.26 ^a	44.86±4.58 ^a	4.23±1.13 ^a
	<i>t</i>	10.185	8.002	5.295
	<i>P</i>	<0.001	<0.001	<0.001

Note: Compared with the same index before treatment in the same group, ^a*P* < 0.05

2.2 Prognosis

After 6 months of treatment, the GOS score of the observation group [(4.46±0.53) points] was higher than that of the control group [(4.12±0.48) points], and the difference was statistically significant (*t*=3.362, *P*=0.001).

2.3 Adverse reactions

In the observation group, there were 3 cases of vertigo and headache, and 1 case of insomnia, with a total incidence of 8.00% (4/50). There were 2 cases of vertigo and headache in the control group, and the total incidence rate was 4.00% (2/50); There was no significant difference in the total incidence of adverse reactions between the two groups ($\chi^2 = 0.177$, *P* = 0.674).

3 Discussion

At present, drugs are the main means of treatment of dilated cardiomyopathy, which can effectively improve the myocardial defect of patients with dilated cardiomyopathy and improve the prognosis of patients. However, it is still uncertain which drug treatment effect is better. Therefore, it is of great significance to find safe and effective drugs to improve the overall situation of patients with dilated cardiomyopathy.

Furosemide, as a diuretic, can increase prostaglandin E₂ level, dilate renal vessels and reduce renal vascular resistance by inhibiting the activity of prostaglandin degrading enzyme, so as to increase blood flow and improve cardiac function. Perindopril is an angiotensin converting enzyme inhibitor, which can improve the heart function of patients by inhibiting the conversion of angiotensin, expanding the body's arteries, reducing blood volume and vascular resistance. Digoxin is a digitalis drug, which can enhance myocardial contractility, improve pump function, slow down the heart rate, thereby

inhibiting the myocardial conduction system, thereby improving the patient's heart function. However, due to the interference of multiple factors and adverse drug reactions, the effect of some patients using the above drugs is not ideal, which is not conducive to the prognosis of patients. For metoprolol, Zhou Zheng and other studies have confirmed that metoprolol has a good effect in the treatment of dilated cardiomyopathy with chronic heart failure, but their studies did not explore the effect of metoprolol on LVEF, SV, CO levels and prognosis of patients, and there are still deficiencies in the study^[3]. Therefore, this study explored the effect of metoprolol on cardiac function and prognosis in patients with dilated cardiomyopathy. The results showed that after 6 months of treatment, LVEF, SV, CO levels of the two groups were higher than before treatment, and the observation group was higher than the control group; The GOS score of the observation group was higher than that of the control group, indicating that metoprolol has a better effect in the treatment of patients with dilated cardiomyopathy, which can improve the cardiac function and prognosis of patients, confirming the above conjecture. The reason may be that metoprolol can selectively inhibit the activity of β - adrenoceptor in patients' heart, and reduce the myocardial contractile velocity and stimulation conduction velocity; At the same time, metoprolol can also reduce myocardial oxygen consumption, improve the cardiac function of patients, and then help to improve the prognosis of patients^[4-5]. In terms of adverse reactions, the results of this study showed that there was no significant difference in the total incidence of adverse reactions between the two groups, indicating that metoprolol treatment of dilated cardiomyopathy will not increase the incidence of adverse reactions. The reason may be that the adverse reactions caused by metoprolol are mostly related to the drug entering into cerebrospinal

fluid, and the oral absorption of metoprolol is rapid and safe, so the occurrence of adverse reactions can be controlled to the greatest extent.

In conclusion, metoprolol has a good effect in the treatment of patients with dilated cardiomyopathy, which can improve the cardiac function and prognosis of patients, and will not increase the incidence of adverse reactions.

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