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Observing the Clinical Effect of Low-dose Thyroxine Combined with Irbesartan/Hydrochlorothiazide on Senile Severe Heart Failure

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Abstract: Objective: To explore the clinical effect of low-dose thyroxine combined with irbesartan/hydrochlorothiazide on senile severe heart failure. Methodology: 60 patients with senile severe heart failure admitted to Department of Cardiology of our hospital from March 2015 to September 2016 were selected. 29 patients in the control group received low-dose thyroxine therapy and 31 in the experimental group received low-dose thyroxine combined with irbesartan/hydrochlorothiazide therapy. Results: The T_3, T_4 and LVEF levels in two groups before and after treatment were statistically significant ($P < 0.05$). Compared with the control group, the LVEF, T_3 and T_4 levels in the experimental group increased after treatment ($P < 0.05$). NYHA comparison between two groups before and after treatment was statistically significant ($P<0.05$). NYHA was more significantly improved in the experimental group and the comparison with the control group was statistically significant ($P<0.05$). The total effective rate was 93.5% in the experimental group and 79.3% in the control group. The difference was statistically significant ($P < 0.05$). Conclusion: Low-dose thyroxine combined with irbesartan/hydrochlorothiazide has a significant effect on senile severe heart failure and is worth adopting.

Keywords: thyroxine, irbesartan/hydrochlorothiazide, senile severe heart failure

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1. CURATIVE EFFECT ANALYSIS

Congestive heart failure (CHF) is a clinically common disease and belongs to clinical emergency diseases. The incidence of CHF will increase with age. CHF is reduced myocardial contraction and decreased cardiac ejection, caused by various diseases. The body develops a series of clinical syndromes. The bodily functions of the elderly are weakened and often

accompanied by a variety of diseases. Their incidence of CHF is higher than other groups. The mortality is high. Studies show that [1] CHF not only causes myocardial damage, but also triggers neuroendocrine changes and reduces serum thyroxine in CHF. So to a certain extent, it is feasible to treat CHF with thyroxine. For this end, our study selects 60 patients with senile severe heart failure admitted to our hospital from March 2015 to September 2016 to explore the effect of low-dose thyroxine combined with irbesartan/hydrochlorothiazide on senile severe heart failure. Now, the process is reported as follows:

2. DATA AND METHOD

2.1 General Data

60 patients with senile severe heart failure admitted to Department of Cardiology of our hospital from March 2015 to September 2016 were selected as research samples. All of them conformed to the diagnostic criteria of CHF defined by American Heart Association (AHA) and typical symptoms and signs of CHF. ECG examinations showed left ventricular enlargement and the left ventricular ejection fraction (LVEF) was equal to or less than 0.50. Patient with the complications of angina, myocardial infarction and hepatic and renal insufficiency were ruled out. The patients were divided into two groups: 31 patients in the experimental group and 29 patients in the control group. In the experimental group, there were 17 males and 14 females, aged 53~72. The average age was 62.5±2.3. According to the classification of New York Heart Association (NYHA), there were 21 Class III patients, 10 Class IV patients, 13 coronary heart disease (CHD) patients, 15 hypertensive heart disease (HHD) patients and 3 rheumatic heart disease (RHD) patients. In the control group, there were 16 males and 13 females, aged 55~70. The average age was 62.5±2.8. According to the classification of New York Heart Association (NYHA), there were 18 Class III patients, 11 Class IV patients, 8 CHD patients, 14 HHD patients and 7 RHD patients. Comparing the general data of two groups, their differences in age, gender and disease type, etc., were not statistically significant (P>0.05). They were comparable.

Table 1 Comparison between Two Groups in General Data (Patients)

Group	Average Age	Gender		Disease			NY-HA Class	
		Male	Female	CHD	HHD	RHD	III	IV
Experimental Group	(62.5±2.3)	17	14	13	15	3	21	10
Control Group	(62.5±2.8)	16	13	8	14	7	18	11

2.2 Method

After two groups were admitted to our hospital, they were given cardiotonic, diuretic and vasodilating drugs as a basic treatment for CHF. On this basis, irbesartan/hydrochlorothiazide (Hangzhou Sanofi-Aventis Pharmaceuticals Co. Ltd., SFDA Approval No.: IX20050278) was administered to the experimental group, 1 tablet each time, once a day. Meanwhile, patients took low-dose L-thyroxine tablets (Yangtze River Pharmaceutical Group- Sichuan Hairong Pharmaceutical Co., Ltd., SFDA Approval No.: H20041605) orally, 12.5ug per day for 3d in a row. Later, the dosage was changed to 25ug per day for 14d in a row. After 7d, the dosage was reduced according to the patients' conditions. Both groups received treatment for 25d in a row (1 course of treatment). Changes in patients' conditions during administration were observed, to see whether they had any adverse reactions. Patients were advised not to smoke or drink and have reasonable diets [2].

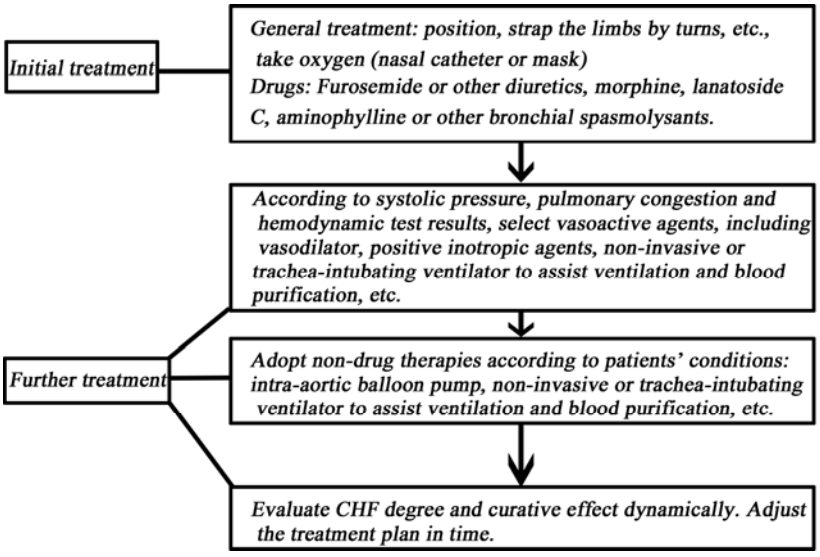

Figure 1 Basic Treatment Process of CHF Patients

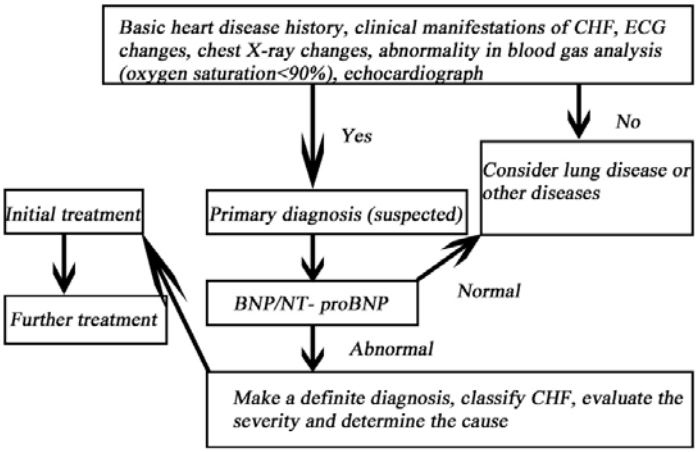

Figure 2 the Diagnosis Process of CHF

2.3 Observed indicators

The serum triiodothyronine (T_3 and T_4) levels in two groups before and after treatment were observed and measured using radioimmunoassay. LVEF was measured with echocardiography. Changes in NYHA functional classification were observed.

2.4 Criteria

If the symptoms were on the mend and cardiac functions were improved by 2 classes or more, the therapy was considered as significant. If the symptoms were relieved and cardiac functions were improved by 1 class, the therapy was considered effective. If the cardiac functions were not improved and symptoms didn't change, the therapy was considered ineffective.

2.5 Statistical processing

Using SPSS15.0 software, the enumeration data were analyzed statistically. Using standard deviation $\bar{\chi} \pm s$ and % to measure and enumerate, t-test was applied to intergroup data measurements. χ^2 test was applied to enumeration data. The verifying criterion was 0.05. $P < 0.05$ meant statistical significance.

3. RESULTS

3.1 Comparison between two groups in changes of T3, T4 and LVEF levels

Comparing results before and after treatment, the LVEF level in the control group increased. The T_3, T_4 and LVEF levels in the experimental group increased. The differences were statistically significant ($P<0.05$). Compared with before treatment, the T_3 and T_4 levels in the control group didn't change significantly ($P>0.05$). Compared with the control group, the LVEF, T_3 and T_4 levels in the experimental group increased ($P<0.05$), as shown in Table 2 below.

Table 2 Comparison between Two Groups in T3, T4 and LVEF Levels Before and After Treatment ($\bar{\chi}$ ±s)

Group	Patients	Indicator	Before Treatment	After Treatment
Experimental Group	31	T3 (nmol/L)	0.56±0.12	1.20±0.21
		T4 (nmol/L)	89.25±12.26	152.26±11.26
		LVEF (%)	35.24±2.25	53.26±4.25
Control Group	29	T3 (nmol/L)	0.45±0.12	0.87±0.11
		T4 (nmol/L)	97.14±13.21	98.23±14.26
		LVEF (%)	39.14±3.20	45.21±0.14

3.2 Comparison between two groups in NYHA before and after treatment

Compared with before treatment, the NYHA functional classifications of two groups were obviously improved after treatment. The difference was statistically significant (P<0.05). Compared with the control group, the NYHA functional classification in the experimental group was more significantly improved. The difference was statistically significant (P<0.05), as shown in Table 3.

Table 3 Comparison between Two Groups in NYHA Functional Classification **(** $\bar{\chi}$ ±s**)**

Group	Patients	Before Treatment	After Treatment
Experimental Group	31	4.05±0.21	2.14±0.12
Control Group	29	4.15±0.16	2.98±0.18

3.3 Comparison between two groups in curative effect

The total effective rate was 93.5% in the experimental group and 79.3% in the control group. The difference was statistically significant (P <0.05), as shown in Table 4.

Table 4 Comparison between Two Groups in Curative Effect (Patients, %)

Group	Patients	Significant	Effective	Ineffective	Total Effective Rate
Experimental Group	31	26	3	2	93.5
Control Group	29	21	2	6	79.3
P				＜0.05	

4. DISCUSSION

Thyroid hormones not only affect myocardial energy metabolism of patients, but also affect cardiac systole, promote the enzymatic activity of Na+/K+ and –ATP, further increase cardiac output, boost myocardial contraction, facilitate the relaxation of peripheral vascular smooth muscles and reduce peripheral vascular resistance. The serum T_3 and T_4 levels in CHF patients will change. From this, we can judge and evaluate the conditions of CHF patients. Studies show that [3-4] the serum T_3 levels in patients and animals with CHF are lower, but T_4 levels will rise and further elevate the patients' thyroid-stimulating hormones. When patients are administered thyroid hormones to treat CFH, they can enhance myocardial contraction, reduce peripheral vascular resistance, relieve cardiac load and increase coronary blood-flow volume. Irbesartan/hydrochlorothiazide is a clinically common compound preparation. Hydrochlorothiazide may act on the renin- angiotensin- aldosterone system and play a significant antihypertensive effect. But after taking the drug, the patients' serum potassium level will drop. Irbesartan is a kind of specific angiotensin converting enzyme-I receptor antagonist [5]. It has remarkable antihypertensive effect. Irbesartan/hydrochlorothiazide can effectively reduce blood pressure, while controlling the incidence of hypokalemia.

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