Article

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Study on the Therapeutic Value of Shexiang Tongxin Dropping Pills in Patients with Stable Angina Pectoris of Coronary Heart Disease Complicated with Cognitive Impairment

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Abstract

Background: There is a pressing need to identify pharmaceuticals that are both safe and efficacious, with lower toxicity, for the treatment of stable angina pectoris in individuals suffering from coronary heart disease. The aim of this paper is to explore the therapeutic value of Shexiang Tongxin Dropping Pills in patients with stable angina pectoris of coronary heart disease complicated with cognitive impairment.

Methods: 200 patients with stable angina pectoris combined with cognitive dysfunction and coronary heart disease admitted to our hospital from January 2022 to June 2023 were retrospectively selected as the study objects. According to the treatment method, the subjects were divided into a control group and a study group, with 100 cases in each group. The control group received conventional oral Western medicine, and the study group underwent treatment with Shexiang Tongxin Dropping Pills in addition to traditional Western medicine. The course of treatment was eight weeks. The enhancement in angina pectoris, cognitive function level, self-care ability, and clinical efficacy of both groups were assessed by comparing the conditions before and after the treatment.

Results: After treatment, the frequency and duration of angina pectoris attacks in both groups were significantly lower than before, and the study group was lower than the control group ($p < 0.05$). The Montreal Cognitive Assessment (MoCA) score of both groups was higher than before, and the score of the study group was significantly higher than that of the control group ($p < 0.05$). Neuropsychiatric Inventory (NPI) scores in both groups were significantly lower than before, and the scores of the study group were significantly lower than those of the control group ($p < 0.05$). Traditional Chinese Medicine (TCM) syndrome scores in both groups were significantly lower than before, and the scores of the study group were significantly lower than those of the control group ($p < 0.05$). After treatment, the total effective rate of the control group and the study group was 81.00% and 93.00%, respectively, and the total clinical effective rate of the study group was significantly higher than that of the control group ($p < 0.05$).

Conclusion: Shexiang Tongxin Dropping Pills can effectively reduce the incidence of angina pectoris in patients with stable angina pectoris complicated with coronary heart disease and cognitive dysfunction. It can also regulate the patient's neurological function, improve their cognitive level, and significantly improve clinical efficacy.

Keywords

Shexiang Tongxin Dropping Pills; coronary heart disease stable angina pectoris; cognitive impairment; mental behavior; clinical efficacy

Introduction

Stable angina pectoris is a common clinical cardiovascular disease characterized by precordial squeezing pain [1]. The cause of angina pectoris is coronary atherosclerosis and stenosis, resulting in myocardial ischemia and hypoxia. When the onset occurs, there is severe pain in the precordial area. The clinical manifestations are varying degrees of chest discomfort and chest pain. Severe cases may result in death due to massive myocardial infarction [2]. With

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the aging of the Chinese population, the incidence of stable angina pectoris in coronary heart disease has been on the rise in recent years. It is reported that the incidence of coronary heart disease in China is 12.3%, and the mortality rate is 2.41% [3]. Most high-risk groups are middle-aged and elderly people [4].

Mental state and cardiovascular disease are interrelated and inseparable. At present, coronary heart disease is associated with dementia and mild cognitive impairment. The risk of vascular dementia is 6.05 times that of people without coronary heart disease, and the risk of Alzheimer's disease is 2.6 times that of people without a history of coronary heart disease [5]. Patients with coronary heart disease and stable angina with cognitive impairment have a poorer prognosis and take longer to recover. Facing a severe decline in the cognitive function of patients will not only lead to a rapid decline in memory and problem-solving abilities, but will gradually evolve into dementia without intervention and treatment, making it challenging to take care of themselves, causing significant damage to the quality of life of the patient [6]. Therefore, there is a pressing requirement to find safe and effective drugs with low toxicity and side effects for the clinical management of stable angina pectoris with coronary heart disease.

Shexiang Tongxin Dropping Pill is a Chinese patent medicine recorded in the "Chinese Pharmacopoeia" and can treat chest pain and obstruction [7]. The musk contained in it renews the mind, enhances blood circulation, and alleviates pain, and the bezoar and borneol have the effects of clearing away heat and reducing phlegm [8,9]. It has been found through clinical application that Shexiang Tongxin Dropping Pills can enhance angina pectoris and have a certain effect on coronary heart disease. However, its therapeutic impact on coronary heart disease stable angina pectoris combined with cognitive impairment is still unclear [10].

Therefore, based on previous research, this study took 200 patients with stable angina pectoris with cognitive impairment as the research object and analyzed the effect of the Shexiang Tongxin Dropping Pill on the onset of angina before and after treatment in patients with stable angina with cognitive impairment. The situation, cognitive function, and clinical efficacy are discussed to explore its therapeutic value and provide reference materials for the clinical management of stable angina pectoris with coronary heart disease and cognitive impairment.

Materials and Methods

Research Subjects

Patients diagnosed with stable angina pectoris accompanied by cognitive dysfunction due to coronary heart disease were retrospectively chosen as the subjects of our study and admitted to the Second People's Hospital of Lishui between January 2022 and June 2023. The clinical data were examined, and 200 cases were ultimately included in the analysis. According to the treatment method, they were divided into a control group (n = 100) and a study group (n = 100). The research received approval from the Second People's Hospital of Lishui's Medical Ethics Committee (20230913-01), and the complete experimental procedure was informed by the patient or family members. This study was carried out in compliance with the Declaration of Helsinki.

Inclusion criteria: (1) Conform to the diagnostic criteria for stable angina pectoris associated with coronary heart disease as outlined in the "Guidelines for the Diagnosis and Treatment of Chronic Stable Angina Pectoris" [11]. (2) Stable angina pectoris with coronary heart disease diagnosed by clinical symptoms, electrocardiogram, and other examinations. (3) Meet the diagnostic standards for cognitive impairment in the "Chinese Classification Scheme and Diagnostic Criteria for Mental Disorders, Third Edition (CCMD-3)" [12]. (4) Montreal Cognitive Assessment (MoCA) scale score <26 points [13].

Exclusion criteria: (1) Patients with pre-existing mental disorders. (2) Patients with severe lesions in the heart, liver, kidney, and other vital organs. (3) Patients with other spontaneous bleeding tendencies. (4) Patients facing significant challenges in vision, hearing, or language abilities that hinder their ability to undergo various assessments. (5) Patients who are allergic to the known ingredients of this drug. (6) Patients who have recently received other drug therapy.

Treatment Method

Patients in the control and study groups received the same health instructions, including basic interventions such as diet control, smoking cessation, popular education on coronary heart disease, appropriate exercise, and lifestyle adjustment. Patients in the control group received 100 mg aspirin enteric-coated tablets (J20171021, Bayer HealthCare Msaufuctring S.r.l, Beijing, China) orally in the morning once a day. Take atorvastatin calcium tablets 20 mg (H20051408, Pfizer Pharmaceutical Co., Ltd., Dalian,

Table 1. Comparison of general information between the two groups of patients [($\bar{x} \pm s$), n (%)].

Items		Control group (n = 100)	Observation group (n = 100)	χ^2/*t*-value	*p*-value
Gender	Male	69 (69.00)	67 (67.00)	0.092	0.762
	Female	31 (31.00)	33 (33.00)		
Age (years)		56.25 ± 5.92	55.54 ± 5.85	0.853	0.395
Course of disease (years)		6.82 ± 1.41	7.15 ± 1.63	1.531	0.127
Medical history	Hypertension	34 (34.00)	31 (31.00)	0.716	0.699
	Diabetes	45 (45.00)	43 (43.00)		
	Hyperlipidemia	21 (21.00)	26 (26.00)		

Table 2. Comparison of angina pectoris attacks between the two groups of patients ($\bar{x} \pm s$).

Groups	Number of cases	Attack times (times)		Duration (min)	
		Before treatment	After treatment	Before treatment	After treatment
Control group	100	6.85 ± 0.85	4.28 ± 0.41*	2.79 ± 0.33	1.63 ± 0.14*
Study group	100	6.78 ± 0.76	2.17 ± 0.34*	2.83 ± 0.39	0.68 ± 0.08*
t-value		0.614	8.576	0.783	7.935
p-value		0.540	<0.001	0.435	<0.001

Note: Compared with the same group of patients before treatment, *$p < 0.05$.

China) orally before going to bed once a day. The dose of Metoprolol succinate sustained-release tablets 23.75 mg (J20150044, AstraZeneca Pharmaceuticals Co., Ltd., Wuxi, China) was adjusted according to the patient's heart rate on the day. Nitroglycerin tablets, 0.5 mg sublingually when angina pectoris occurs (H37021445, Shandong Xinyi Pharmaceutical Co., Ltd., Dezhou, China). Based on the control group, the research group was given Shexiang Tongxin Dropping Pills 70 mg (140000, Inner Mongolia Kangenbei Pharmaceutical Co., Ltd., Erdos, China) orally after meals, three times/day, twice a day. Both groups of patients received treatment for eight weeks.

Observation Metrics

(1) Attack of angina pectoris: The frequency and duration of angina pectoris were recorded before treatment and four weeks after treatment, and were calculated and compared.

(2) Cognitive function assessment: The overall cognitive status of the two groups before and after treatment was assessed using the Montreal Cognitive Assessment Scale (MoCA) [13]. The MoCA scale is a comprehensive tool to evaluate cognitive function. The scoring criteria cover reference indicators in eight areas, including language, visuospatial, and abstract ability. The total score is 30 points; the lower the score, the more severe the cognitive dysfunction, and the years of education ≤12 years plus 1 point.

(3) Evaluation of neurological function: The Neuropsychiatric Inventory (NPI) [14] was utilized to assess and compare the mental behavior of the patients before and after therapy. In the past month, an informed person provided the patient's mental and behavioral performance. NPI included 12 mental and behavioral symptoms, such as delusions, hallucinations, agitation/aggression, depression/dysthymia, anxiety, high mood/joyfulness, apathy/indifference, loss of control, irritability/emotional instability, abnormal motor behavior, sleep/night behavior, poor appetite, and eating disorders, etc. Higher scores on the scale indicate a greater severity of the patient's mental and behavioral symptoms.

(4) Traditional Chinese Medicine (TCM) syndrome score: The "Guiding Principles for Clinical Research of New Drugs in China (Trial)" [15] was referred to formulate the evaluation criteria of the TCM syndrome score. Mental decline, pale complexion, sleepiness, indifference, anxiety, lack of joy, palpitations, shortness of breath, yellow complexion, lukewarm limbs, reluctance to eat, and tongue pulse were evaluated in the two groups of patients. Symptoms are classified into four grades: none, mild, moderate, and severe. The main symptoms were scored on a scale of 0, 2, 4, and 6, while the secondary symptoms were scored on a scale of 0, 1, 2, and 3. A higher score indicates more severe symptoms.

(5) Judgment of clinical curative effect: the "Guiding Principles for Clinical Research of New Drugs in China (Trial)" [15] was referred to and combined with the actual clinical situation to evaluate. Significant effect: the clinical symptoms and signs are significantly improved, the dosage of drugs is reduced considerably, the angina pectoris is sig-

Table 3. Comparison of MoCA scale scores between the two groups of patients ($\bar{x} \pm$ s, score).

Groups	Number of cases	Before treatment	After treatment
Control group	100	20.26 ± 1.95	23.16 ± 2.25*
Study group	100	20.18 ± 1.87	26.19 ± 2.44*
t-value		0.296	9.129
p-value		0.767	<0.001

Note: MoCA, Montreal Cognitive Assessment. Compared with the same group of patients before treatment, *$p < 0.05$.

Table 4. Comparison of NPI questionnaire scores between the two groups of patients ($\bar{x} \pm$ s, score).

Groups	Number of cases	Before treatment	After treatment
Control group	100	15.96 ± 1.36	8.78 ± 2.14*
Study group	100	16.05 ± 1.41	5.64 ± 2.05*
t-value		0.459	10.720
p-value		0.646	<0.001

Note: NPI, Neuropsychiatric Symptom Questionnaire. Compared with the same group of patients before treatment, *$p < 0.05$.

nificantly mitigated or disappears, and the result of electrocardiogram returns to normal. Effective: demonstrating improvement in clinical symptoms and signs, the dosage of drugs is reduced, the angina pectoris is alleviated, and the result of electrocardiogram examination is obviously improved. Ineffective: clinical signs and symptoms did not improve or worsen, there was no reduction in drug dosage, no relief of angina pectoris, and the result of electrocardiogram examination was the same as before treatment or worsened. Total effective rate (%) = (markedly effective + effective) number of cases/total number of cases × 100%. This allows for the assessment and comparison of the overall clinical effectiveness between the two groups.

Statistical Analysis

SPSS 23.0 software (IBM, Armonk, NY, USA) was used for statistical analysis of the data. Data are expressed as mean ± standard deviation ($\bar{x} \pm$ s). The independent sample *T*-test was used for inter-group comparison, while percentage representation was employed for count data. Group comparisons were conducted using the χ^2 test; $p < 0.05$ was considered statistically significant.

Results

Comparison of General Information between the Two Groups

There was no statistically significant difference in general information, including gender, age, course of the disease, and medical history, between the two groups ($p > 0.05$, Table 1).

Comparison of Angina Pectoris Attack in Two Groups

The results indicated that, before treatment, there was no notable distinction in the frequency and duration of angina pectoris attacks between the two groups ($p > 0.05$, Table 2). After treatment, the frequency and duration of angina pectoris were significantly reduced in both groups, and the study group was less than the control group ($p < 0.001$, Table 2).

Comparison of MoCA Scale Scores between the Two Groups

The results indicated that before the initiation of treatment, there was no significant difference in the MoCA scale scores between the two groups ($p > 0.05$, Table 3). Following the treatment, both groups demonstrated a significantly increase in MoCA scale scores compared to their respective pre-treatment levels, and the study group was better than the control group ($p < 0.05$, Table 3).

Comparison of NPI Questionnaire Scores between the Two Groups

The results showed that, prior to the commencement of treatment, there were no significant differences in NPI questionnaire scores between the two groups ($p > 0.05$, Table 4). Following the treatment, the NPI questionnaire scores significantly decreased in both groups compared to their pre-treatment levels; the NPI score of the study group was significantly lower than that of the control group ($p < 0.05$, Table 4).

Table 5. Comparison of TCM syndrome scores between the two groups ($\bar{x} \pm$ s, score).

Groups	Number of cases	Before treatment	After treatment
Control group	100	20.07 ± 2.04	10.62 ± 2.21*
Study group	100	19.98 ± 1.96	7.83 ± 1.65*
t-value		0.318	10.116
p-value		0.751	<0.001

Note: TCM, Traditional Chinese Medicine. Compared with the same group of patients before treatment, *$p < 0.05$.

Table 6. Comparison of clinical curative effect of two groups of patients [n (%)].

Groups	Number of cases	Markedly effective	Effective	Invalid	Total effective rate
Control group	100	42 (42.00)	39 (39.00)	19 (19.00)	81 (81.00)
Study group	100	56 (56.00)	37 (37.00)	7 (7.00)	93 (93.00)
χ^2-value					6.366
p-value					0.012

Comparison of TCM Syndrome Scores between the Two Groups

The results indicated that prior to treatment, there was no significant difference in the scores of TCM syndrome between the two groups ($p > 0.05$, Table 5). After the treatment, the TCM syndrome scores for both groups significantly decreased compared to their pre-treatment levels. The study group demonstrated significantly lower TCM syndrome scores than the control group ($p < 0.05$, Table 5).

Comparison of Clinical Curative Effect between Two Groups of Patients

Following the treatment, the overall effective rates in the control and study groups were 81.00% and 93.00%, respectively. The total clinical effective rate in the study group was significantly superior to that in the control group ($p < 0.05$, Table 6).

Discussion

The patients with stable angina pectoris refer to those with relatively stable angina pectoris attack degree, attack frequency, and predisposing factors, and can be well controlled and prevented from worsening after standard treatment [16]. The main pathogenesis of stable angina includes decreased coronary blood flow, increased blood viscosity, chronic nonspecific inflammation, and myocardial ischemia and hypoxia. When not controlled or treated in time, it is straightforward to develop into myocardial infarction, which poses a grave risk to the safety of the patients' lives [17]. The causes of cognitive dysfunction include insufficient cerebral blood supply and cerebral ischemia and hypoxia, leading to symptoms such as mental retardation, neurological decline, and memory loss in patients, which affect the quality of life of patients [18]. Aspirin, β-receptor blockers, and statins are mostly used clinically to treat stable angina pectoris. Although satisfactory curative effects can be obtained, there are still poor curative effects and no improvement in neurological function in patients with cognitive impairment.

This study found that Shexiang Tongxin Dropping Pills combined with conventional Western medicine can significantly reduce the frequency of angina attacks in patients with stable angina pectoris, prolong the time of treadmill exercise, reduce the maximum ST-segment depression of the treadmill electrocardiogram, and increase the metabolic equivalent of treadmill exercise [19]. Another study reported that Musk Tongxin Dropping Pills can accelerate coronary blood flow and mitigate angina symptoms in patients with vascular angina pectoris, and taking Musk Tongxin Dropping Pills before physical activities that may cause angina can prevent angina attacks [20]. And the study found that Shexiang Tongxin Dropping Pills can significantly improve the cognitive function level of patients with mild cognitive impairment and improve symptoms such as memory loss and mental retardation [21]. In this research, we selected 200 patients diagnosed with stable angina pectoris and cognitive impairment from our hospital as the subjects to investigate the impact of Shexiang Tongxin Dropping Pills on the co-occurrence of stable angina pectoris and its effects on angina occurrence, cognitive function, and clinical outcomes in patients with cognitive impairment. The findings indicated a significant reduction in the frequency and duration of angina attacks in both cohorts after treatment, with the study group showing a decreased frequency and duration compared to the control group. This

suggests that Shexiang Tongxin Dropping Pills can effectively ameliorate angina pectoris attacks, reducing their occurrence and duration. Modern research indicates that stable angina is closely related to dyslipidemia, inflammatory response, autonomic dysfunction, abnormal coagulation and hemolysis system, abnormal blood rheology, endothelial function, and oxidation reaction [22]. Drugs enhancing blood circulation and removing blood stasis can improve blood circulation, microcirculation, and rheology. At the same time, medications for reducing phlegm and turbidity can also reduce blood viscosity and improve blood rheology [23,24]. Shexiang Tongxin Dropping Pills comprise artificial musk, toad venom, salvia miltiorrhiza, total saponins from ginseng stems and leaves, bear bile powder, artificial bezoar, and borneol. Pharmacological investigations have demonstrated that Shexiang Tongxin Pills possess anti-inflammatory properties, blood lipid regulation, anti-oxidative stress, anti-atherosclerotic plaque, protection of myocardial cells, protection of vascular endothelium, and improvement of microcirculation [25,26]. Its main ingredient, musk, can alleviate the dysfunction of vascular endothelial cells, improve the metabolism of damaged cardiomyocytes, and delay the onset of cardiac remodeling [27]. Furthermore, within the scope of this study, the clinical therapeutic effectiveness noted in the study group was significantly better than that observed in the control group, which proves that the Shexiang Tongxin Dripping Pill is beneficial to improve the clinical curative effect and has a significant effect on improving symptoms such as angina pectoris.

China's epidemiological statistics show that cardiovascular and cerebrovascular diseases are closely related to neurological diseases, and there are some patients with cardiovascular diseases combined with cognitive impairment [28]. Such patients are prone to a rapid decline in cognitive function and reduced treatment compliance. The two diseases interact with each other, forming a vicious circle effect and aggravating the progression of the disease [29]. Previous studies have shown that Musk Tongxin Dropping Pills not only has the effect of dredging the cardiovascular system but also helps to relieve neurological decline and improve cognitive function to a certain degree [30]. In this investigation, the MoCA scale scores of patients in both groups increased compared to pre-treatment values. The NPI questionnaire scores demonstrated a decrease compared to pre-treatment levels. The MoCA scale scores in the study group substantially increased compared to the control group. Additionally, the NPI questionnaire scores were markedly reduced in the study group compared to the control group. These findings imply that timely intervention improved both groups' neurological and cognitive function levels, alleviating symptoms such as memory loss and cognitive decline. Traditional Chinese medicine believes that cognitive dysfunction is mainly related to kidney deficiency, blood stasis-blocking collaterals, and mental dysfunction [31]. The Shexiang Tongxin Dropping Pills were used in this study, in which musk and borneol can refresh the mind, toad venom can promote blood circulation and promote Qi and blood production, Danshen has anti-inflammatory and anti-oxidative stress, total saponins of ginseng stems and leaves can relax blood vessels, reduce Blood viscosity, and other effects [32–34]. The combination of various drugs can regulate the brain sebum nerve activity of patients with cognitive dysfunction, accelerate the plasticity of synapses, repair the loss of nerve function, and regulate brain function [35]. Furthermore, in the context of this study, the Traditional Chinese Medicine (TCM) syndrome score in the study group exhibited a significant reduction compared to the control group. This provides additional evidence that Shexiang Tongxin Dropping Pills have a more pronounced ability to alleviate angina pectoris in patients with stable angina pectoris complicated by coronary heart disease and cognitive impairment, regulate neurological function and improve the cognitive level of patients.

Conclusion

In conclusion, Shexiang Tongxin Dropping Pills can effectively reduce the incidence of angina pectoris in patients with stable angina pectoris complicated with coronary heart disease and cognitive dysfunction. It can also regulate the patient's neurological function, improve their cognitive level, and significantly improve clinical efficacy.

Availability of Data and Materials

The data used to support the findings of this study are available from the corresponding author upon request.

Author Contributions

JJC and QJP designed the research study. JJC performed the research. QJP analyzed the data. Both authors contributed to editorial changes in the manuscript. Both authors read and approved the final manuscript. Both authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The research received approval from the Medical Ethics Committee of the Second People's Hospital of Lishui (20230913-01), and the complete experimental procedure was informed by the informed consent of the patient or family member. And the study was carried out in compliance with the Declaration of Helsinki.

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Conflict of Interest

The authors declare no conflict of interest.

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