


## CASE REPORT

# Eight years follow-up of a patient with triple vessel disease patient complicated with heart failure without invasive intervention for home-based exercise rehabilitation combined traditional Chinese medicine: A case report

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**Abstract**

We report 8-year follow-up of a home-based exercise rehabilitation program combined traditional Chinese medicine for a patient with triple vessel disease patient complicated with heart failure without invasive intervention. Improvements were observed in all outcomes.

**KEYWORDS**

exercise capacity, heart failure, home-based cardiac rehabilitation, traditional Chinese medicine, triple vessel disease

## 1 | INTRODUCTION

Heart failure (HF) has been the leading cause of mortality with its increasing prevalence all over the world.<sup>1</sup> There are greater than 4 million adults with HF in China versus 6.5 million in the United States.<sup>2,3</sup>

The orthodox treatment of HF includes angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARB),  $\beta$  receptor blockers, diuretics, aldosterone receptor antagonists, digitalis, and vasodilation agents.<sup>4,5</sup> Despite the well-known benefits, mortality of HF still rises yearly.

Cardiac rehabilitation (CR) had been testified effective and safe as the aspect of improving the exercise tolerance and quality of life in patients with HF.<sup>6</sup> However,

the overall participation rate of the CR program is always very low, due to different barriers in different countries and areas.<sup>7</sup> Home-based cardiac rehabilitation tends to be more likely to be taken into account and more convenient for patients than center-based CR.<sup>8</sup> Meanwhile, some Chinese herbs show their unique advantages in the treatment of HF.<sup>9–11</sup> The previous studies indicated that Qili Qiangxin capsules combination is safe and effective in patients with chronic heart failure and promotes the New York Heart Association (NYHA) functional classification, left ventricular ejection fraction (LVEF), 6-minute walking distance (6MWD), and quality of life.<sup>12</sup>

However, data on long-term follow-up of home-based CR combination with TCM are sparse. We report a patient with severe triple vessel disease and heart failure who

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TABLE 1 Eight years follow-up of outcomes

	2012-10-08	2013-07-09	2014-09-10	2015-11-09	2016-09-11	2017-11-01	2018-10-07	2019-11-07	2020-08-07	2021-07-08
LDL-C (mg/dl)	63	39.6	32.4	35.64	32	37.8	28.8	29.7	31.2	29.7
TC (mg/dl)	81	70.2	72.18	65.52	71.46	52.02	46.08	47.7	46.3	48.1
TG (mg/dl)	21.6	29.7	15.48	17.64	9	21.6	17.1	11.7	12.4	11.9
Systolic BP	110	123	122	120	119	119	129	119	126	118
Diastolic BP	70	65	68	58	65	63	67	58	58	62
Ejection fraction	20	33	40	48	55	50	57	55	57	56
LVDd (mm)	65	58	59	55	48	46	49	50	51	48
6MWT distance (m)	320	450	487	465	490	478	512	550	567	589
METS	2.3	3.3	3.1	2.9	3.4	3.2	3.7	3.9	3.8	4.2
NT-proBNP	10,740	4510	1090	465	340	116	136	173	98	105
VO2max (ml/kg/min)	8.5	11	10.3	9.8	15.5	10.9	17.8	19.2	18.1	22.3

Abbreviations: 6MWT, 6 minutes walking test; BP, blood pressure; LDL-C, low-density lipoprotein cholesterol; LVDd, left ventricular diameter; METS, metabolic equivalent; NT-proBNP, N-terminal prohormone of brain natriuretic peptide; TC, total cholesterol; TG, triglyceride; VO2max, maximal oxygen uptake.

underwent home-based CR coupled with TCM in our center over 8 years follow-up.

## 2 | CASE REPORT

The patient, a 65-year-old male, was presented to our hospital in September 2012 with the symptom of chest pain at rest, with no history of smoking. Physical examination showed well, with the heart rate 90 beats per minute and blood pressure 130/80 mmHg. Coronary angiography (CAG) showed optimal occlusion of the left main coronary artery (LM), 80% stenosis of the right coronary artery (RCA), 80%–90% stenosis of the left anterior descending (LAD), and 90% stenosis of the left circumflex (LCX). Medical history revealed hypertension and diabetes mellitus. The optimal therapeutic was coronary artery bypass graft (CABG), however, the patient refused and was then denied by our department. One month later, this patient was readmitted to our hospital complaining of dyspnea, fatigue, and shortness of breath induced by exercise. Laboratory tests showed N-terminal prohormone of brain natriuretic peptide (NT-proBNP) was 10,740 pg/ml (reference values are 0–125 pg/ml). Echocardiography showed the left ventricular ejection fraction (LVEF) of 20% in addition to left ventricular(LV) hypertrophy. Six-minute walking test (6MWT) showed 320 m. Accordingly, the patient was performed with heart failure (HF), New York Heart Association class (NYHA) class III-IV, and then referred to the inpatient for up-titration of HF medication, and exercise rehabilitation.

## 3 | TREATMENT AND INTERVENTION

Medicine therapy: aspirin 100 mg/day, isopropanol 2.5 mg/day, atorvastatin 20 mg/day, ramipril 5 mg/day, furosemide 20 mg/day, spironolactone 20 mg/day adjuvant with traditional Chinese medicine(TCM) such as qili qiangxin capsules(QLQX) 1.2 g, three times/day.

Home-based exercise prescription: this patient receives self-monitored exercise therapy which mainly consisted of walking 30–45 min every day. The intensity is set to 50%–60% peak HR achieved on 6MWT for the training benefits, which were in line with the recommendation of the American College of Sports Medicine.<sup>13</sup> Borg Rate of Perceived Exertion (RPE) scale was used to adjust the exercise intensity. For the cardiovascular benefits, RPE needs to be maintained at 11–13 during this period.<sup>14,15</sup>

The first cardiopulmonary exercise testing (CPET) took place during the first month of HBCR. The respiratory exchange ratio was 1.10, and the VO2max was 8.5 ml/kg/

min, with the metabolic equivalents (METs) showing 2.3 melts.

## 4 | FOLLOW-UP AND OUTCOMES

Regular follow-up was performed by licensed cardiologists or nurses. Initially, the patient saw the clinic once every month, 3 months later, he visited once every 3 months. Afterward, he saw the clinic once in half or 1 year regularly. Each time, this patient received laboratory test including serum cholesterol, triglycerides, glucose, BNP, ECG, echocardiography, 6MWT, and CPET. Up to now, the patient has been taken by the homeopathic therapy and insisted on walking rehabilitation for 8 years. During this period, this patient was located in stable condition constantly and the transatlantic echocardiogram (TTE) showed an improvement of the LVEF from 20% to 55%, with the left ventricular diastolic diameter decreased from 65 to 48 mm (Table 1).

## 5 | DISCUSSION

In China, CR is not considered to be a routine therapy method for patients with HF, and the participation rate of center-based CR is not optimistic. This report performed HBCR combined with TCM was useful for the improvement of exercise capacity, heart function, and long-term prognosis. Further studies will be necessary to suggest HBCR as a routine therapy for patients with HF.

We present the benefits of HBCR combined with TCM for treating patients with HF. The TCM named qiliqiangxin(QL) capsule been composed of the 11 ingredients: astragali radix, ginseng, monkshood, Salvia metrorrhagia, semen lipids, Alisma plantago-aquatica, Polygonatum odoros, cassia twig, Carthamus tinctures, cortex periscope, and Chenpi.<sup>12,16</sup> This specific capsule was proved effective to treat patients with chronic heart failure(CHF). It can improve cardiac function, inhibit the renin-angiotensin-aldosterone (RAAS) system further prevent ventricular remodeling, reduce the levels of NT-proB-type natriuretic peptide (NT-proBNP), and indicate the benefits for quality of life.<sup>17</sup>

Decreasing NT-proBNP levels and left ventricular volume, suggested the improvement of cardiac function was largely maintained.

In this case, we did not perform percutaneous coronary intervention (PCI) because this patient was located in protracted stability. During the past few years, people do understand whether an invasive strategy or a conservative strategy with initial optimal medical therapy was the

best choice for patients with stable ischemic heart disease. Surgical treatment for ischemic heart failure (STICH) trial found that there were no significant differences in mortality between the surgical revascularization group and medical therapy alone group.<sup>18</sup> HEART study also reported similar outcomes.<sup>19</sup> However, in this case, we applied HBCR combined with TCM, then showed this method was perfectly safe and effective for the extended period.

Previous studies with a follow-up of more than 5 years are rare. We reported excellent outcomes of a patient with HF under HBCR combined with TCM support for a long time, which has proven its potential clinical utility. Additional studies will be required to substantiate the favorable adaptations for patients with stable HF.

For this patient with triple vessel disease patient complicated heart failure, we did not perform percutaneous coronary intervention, after applying home-based cardiac rehabilitation combined with traditional Chinese medicine, the long-term follow-up shows many benefits.

## 6 | CONCLUSION

Home-based cardiac rehabilitation combined with traditional Chinese medicine may benefit patients with severe-TVD and heart failure without revascularization treatment.

### AUTHOR CONTRIBUTIONS

Sisi Zhang drafted the manuscript. Huiyang Zheng and Xinyu Liu evaluated the patient and were responsible for the follow-up. Xiaoping Meng contributed to reviewing and editing the manuscript. All authors reviewed and approved the final version of the manuscript accepted for publication.

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None.

### CONFLICT OF INTEREST

The authors declare no conflict of interest in preparing this article.

### DATA AVAILABILITY STATEMENT

All data that support the this study are taken from the case clinical records. Details are available on request from the corresponding author.

### CONSENT

The patients in this report had provided written informed consent for publication of this case report and any accompanying data.

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