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Case Report

Chinese Medicine in Treatment of A Patient with Acute Extensive Anterior Myocardial Infarction Complicated by Shock after Percutaneous Coronary Intervention*

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Acute myocardial infarction (AMI) is a clinical syndrome of myocardial ischemia and necrosis caused by acute blocking of the coronary artery. When complicated by cardiogenic shock (CS), it has an extremely high mortality.[1,2] Early reperfusion therapy combined with left ventricular assist device (LVAD) can raise the survival rate to 58.8%–60.9%.[3] We report a case of successful treatment with integrated Chinese and Western medicine on acute extensive anterior myocardial infarction complicated by refractory CS.

Case Presentation

The First Stage

A 46 years old male patient received an emergency treatment due to "chest pain lasts for 1 h" on January 10th, 2014. The ST segments of ECG Ⅰ, aVL and V1-V6 elevated by 0.1–1.0 mV, blood pressure (BP): 80/42 mm Hg, heart rate (HR): 100 beat/min, SO_2: 95%. He was diagnosed as extensive anterior myocardial infarction associated with hypotension. After first medical contact, doctors suggested the patient should be given percutaneous coronary intervention (PCI) immediately, which was rejected by the patient and his family. After 2 h delay, the patient eventually received a thrombolytic therapy by giving 100 mg intravenous thrombolysis of alteplase. Two hours later, the pain was relieved and the ST segments depressed more than 50%. After the successful thrombolytic therapy, the haemodynamics was unstable with BP fluctuating between 69–84/43–47 mm Hg. Intra-aortic ballon pump (IABP) was implanted as adjuvant therapy. Meanwhile, noradrenaline (0.1–0.2 μg·kg^{-1}·min^{-1}) and dopamine (18–20 μg·kg^{-1}·min^{-1}) were medicated to maintain BP around 90/60 mm Hg. Later he was admitted to coronary care unit (CCU). Ultrasound cardiogram (UCG) showed weakened wall motion of left ventricular, left ventricular ejection fraction (LVEF): 28% (Table 1). The Swan-Ganz catheter was used to measure haemodynamics, cardiac index (CI): 2.2 L·min^{-1}·m^{-2}, The patient was diagnosed as: AMI complicated by CS.

Table 1. Changes in UCG during Hospital Stay and Follow-up

Date	LEDD (mm)	LVSD (mm)	LVEF (%)
2014/1/10	43	33	28
2014/1/24	57	45	24
2014/2/17	56	48	26
2014/5/14	59	51	28
2014/5/21	49	38	46
2017/9/6	62	–	40

Notes: UCG: ultrasound cardiogram; LVDD: left ventricular diastolic diameter; LVSD: left ventricular systolic diameter; LVEF: left ventricular ejection fraction

After hospitalization, aspirin, clopidogrel, low molecular heparin and atorvastatin were medicated. Drugs such as nitrates, β-blocker, angiotensin converting enzyme inhibitors (ACEI), and angiotensin receptor blockers (ARB) were denied due to hypotension. Two weeks later, coronary arteriography was implemented under the assist of IABP, indicating the residual stenosis in the end of left main coronary artery was 90% (Figure 1A). A stent (TAXUS, 4.0 mm×8.0 mm) was implanted and blood flow was restored (Figure 1B). Two weeks later, dopamine (20–30 μg·kg^{-1}·min^{-1}) was pumped continuously,

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combined with the adjuvant therapy of IABP. After multidisciplinary consultation, the patient was suggested to take heart transplantation (HT). While the patient and his family agreed to seek help from Chinese medicine (CM) and receive treatment of integrated Chinese and Western medicine.

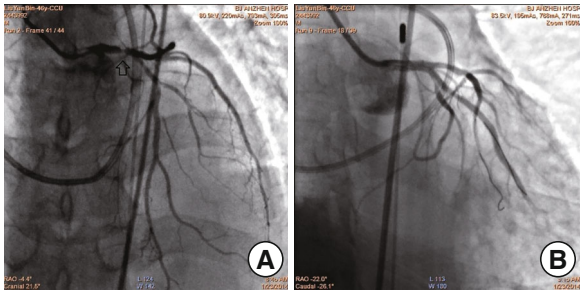

Figure 1. Coronary Arteriography of PCI

Notes: A: The stenosis in the end of left main coronary artery was 90%; B: A stent was implanted. PCI: percutaneous coronary intervention

The Second Stage

A CM consultation was held at CCU, and his symptoms were as follow: palpitation, shortness of breath, faint low voice, poor appetite, dark red tongue body, thin and white tongue fur, thready, rapid yet weak pulse. The CM pattern was deficiency of both qi and yin, internal retention of phlegm-fluid; and the principle of treatment was tonifying qi and nourishing yin, expelling stasis and dredging collaterals, purging Fei (Lung) and excreting water. The formula was *Panax Ginseng* 30 g, *Radix Ophiopogonis* 10 g, *Schisandra Chinensis* 10 g, *Salvia miltiorrhiza* 30 g, *Hirudo Praeparata* 3 g, *Eupolyphagacan* 6 g, *Semen Lepidii* 30 g, *Cortex Mori* 30 g, *Radix Scrophulariae* 30 g, *Polygonatum Odoratumcan* 10 g, *Rhizoma Corydalis* 10 g and *Fructus Aurantii Immaturus* 10 g. All herbs were decocted with water, one dose (200 mL) daily for 7 days.

One week later, the patient's symptoms such as palpitation have been improved. However, clinical manifestations like dark red tongue body, thin and slightly greasy tongue fur, thready, rapid yet weak pulse, still existed. The CM pattern was the same as the last time. The formula was modified by adding fresh *Radix Astragali* 30 g, *Semen Lepidii* 60 g, *Cortex Mori* 60 g, and *Rheum officinale* (stir-fried with yellow rice wine) 10 g. The dosage of dopamine was reduced gradually. Meanwhile the IABP was removed. Forty-nine days after hospitalization, he was discharged. On leaving hospital, BP: 85–95/55–65 mm Hg, HR: 100–110 beat/min; after discharge, the patient continued to take anti-platelet drugs and statins, and Chinese medicinals; β-blocker and ACEI/ARB were denied due to hypotension (Figure 2).

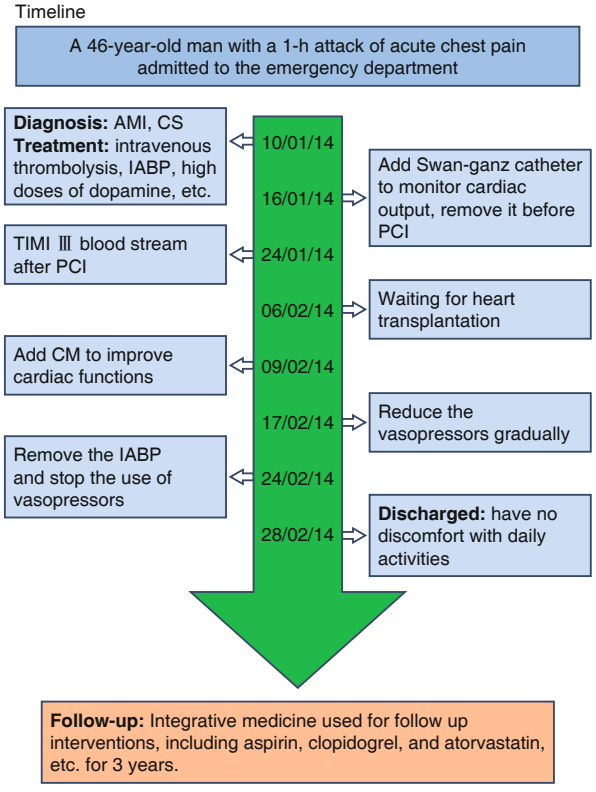

Figure 2. Timeline of Treatment

Notes: AMI: acute myocardial infarction; CS: cardiogenic shock; IABP: intra-aortic ballon pump; TIMI: thrombolysis in myocardial infarction; PCI: percutaneous coronary intervention; CM: Chinese medicine

The Third Stage

According to guidelines,[4,5] AMI patients should be medicated with β-blocker and ACEI/ARB. However, the therapy was not realized in the early stage. The patient was hospitalized in Beijing Hospital of Traditional Chinese Medicine on May 13th, 2014. We carried out the standard medication under the treatment of combined Chinese and Western medicine. His chief complaints included shortness of breath, aggravation of wheezing after slightly physical activity, faint low voice, and dry stool. General Examination: BP: 87/64 mm Hg, HR: 110 beat/min, enlarged left border of heart, small and slight moist rales over both lung bases, slight edema of both legs, pale dark tongue body, white and greasy tongue fur, thready and rough pulse; ancillary examination: brain natriuretic peptide (BNP) >1800 ng/mL; UCG: LVEF: 28%.

The CM pattern was identified as: deficiency

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of both qi and yin, phlegm and stasis bind; method of treatment was tonifying qi and nourishing yin, resolving phlegm and expelling stasis. The formula was *Radix Codonopsis* 30 g, *Radix Scrophulariae* 30 g, *Salviae Miltiorrhizae* 30 g, *Hirudo* 3 g, *Eupolyphaga* 6 g, *Pheretima* 10 g, *Rhizoma Corydalis* 10 g, *Panax Ginseng* 30 g, *Radix Ophiopogonis* 10 g, *Schisandrae Chinensis* 10 g, *Fructus Trichosanthis* 30 g, *Pinellia Ternata* 9 g, *Bulbus Allii Macrostemi* 10 g, *Semen Lepidii* 30 g and *Cortex Mori* 30 g.

Hereafter, the patient showed gradual improvement in his manifestations. On this basis, metoprolol tartaric acid was given with a dose of 3.125 mg, twice a day. After discharge, we changed to metoprolol succinate sustained-release tablets with a dose of 95 mg once a day. Captopril was administrated with a dose of 6.25 mg and twice a day. After discharge, it changed to losartan with a dose of 100 mg once a day. Upon discharge, BP: 95–110/60–70 mm Hg, HR: 80–90 beat/min, no obvious clinical manifestation.

The Fourth Stage

Follow-up treatment lasted 3 years. The usage of CM and Western medicine was adjusted in line with patient's conditions. His BP fluctuated between 90–110/60–70 mm Hg, HR: 60–80 beat/min. The patient managed to recover ability to perform basic activities of daily living and working. On September 6th, 2017, the patient was hospitalized again to perform cardiac function assessment. General examination: BP: 92/62 mm Hg, HR: 62 beat/min; LVDD: 62 mm, LVEF: 40%, no chief complain symptoms.

Discussion

According to China-PEACE, hospitalization rate per 100,000 population among patients with STEMI in China has increased from 3.55% (2001) to 15.4% (2011).[6] Research from National Registry of Myocardial Infarction (NRMI) showed that 29% patients with AMI complicated by CS were at their first visit to doctors. AMI complicated by CS has a mortality rate of 65.4%–100% reported at home and abroad.[1,2] Emergency treatment of PCI or joint LAVD therapy can raise the survival rate to 58.8%–60.9%.[3] Which has become the first treatment choice.[4,5] A study[7] has suggested that integration of basic treatment with CM is possible to increase the survival rate of AMI patients. Our studies[8-10] also proved that intervention in AMI with CM could significantly reduce the case fatality rate. There are even more clinical reports[11] and systematic reviews[12,13] indicating that CM can improve quality of life in patients.

In terms of this case, the first issue encountering the patient was that after early reperfusion therapy. In the early CM intervention, we adopted Shengmai Powder (生脉散) to tonify qi and nourish yin, combining with Fei-purging and water-draining method from Three Methods of Managing Heart.[14] Early study[15] has suggested that CM has the effect of inducing diuresis, dilating vessels and increasing myocardial contraction. A recent study[16] also shows that CM can regulate neuroendocrine function, improve left ventricle remodeling and inhibit apoptosis. The integration of multiple target effect of CM and basic life support eventually helped the patient improve the shock.

The second problem facing the patient was that he cannot take β-blocker and ACEI/ARB drugs due to severe cardiac hypofunction at the acute stage. These drugs have been recommended by guidelines[4,5] at home and abroad. In order to perform standard treatment, we treated him by Lung-purging and water-draining method[14] from which is a CM theory. The method was our specific therapy to treat unstable angina.[17] The formula, Shenyuan Yiqi Huoxue Capsule (参元益气活血胶囊) is the hospital preparation approved by Beijing Food and Drug Administration, and has great effects of protecting myocardium in the cases of ischemia, ischemia-reperfusion,[18] peri-operative period[19] of PCI, and AMI.[20] The formula given to the patient was based on this method, and assisted by medicine of purging the lung and draining water. The standard treatment of metoprolol sustained-release tablets 95 mg/d and losartan 100 mg/d was completed. The integration of CM and Western medicine has achieved its therapeutic purpose perfectly. The patient had a good quality of life during the 3-year follow-up.

Conclusion

In this case, the patient with acute extensive anterior myocardial infarction complicated by refractory CS was treated by CM on the basis of reperfusion therapy and effective basic life support, and then the shock was managed. During later period, the standard treatment was finished, obtaining good effects during long-term follow-up, which is indicative of predominance and characteristics of integrated Chinese and Western medicine.

Conflict of Interest

The authors declare that they have no competing interests.

Author Contributions

Li SB and Xing WL drafted the manuscript; Liu HX and Liu WX treated and clinically evaluated the patient; Sheng J and Zhou Q contributed to the patient's follow-up. All authors contributed to the manuscript's revision and approved the final manuscript.

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