ST-ELEVATION MYOCARDIAL INFARCTION COMPLICATED BY CARDIAC ARREST IN A YOUNG PATIENT WITH FAMILIAL DYSLIPIDEMIA

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Coronary heart disease in young patients always poses great challenges for every healthcare system with differences in clinical manifestations, etiology, epidemiology, angiographic characteristics and prognosis. The objective of this study was to describe a case of ST-elevation myocardial infarction complicated by cardiac arrest in a young patient with familial dyslipidemia. A 30-year-old male visited our hospital with typical angina. During the examination, he suffered a sudden loss of consciousness, the monitor showed ventricular fibrillation. After successful resuscitation of cardiac arrest, electrocardiography showed apparent ST-elevation from V2 to V6 leads consistent with the diagnosis of anterolateral infarction. Emergency coronary angiogram showed severe three-vessel lesions including complete occlusion of the LAD artery and 80 - 90% stenosis of the other two coronary branches. Our patient's coronary arteries were revascularized using drug-eluting stents in LAD artery and subsequently RCA artery, stem cell therapy was applied during the interventional process. Routine laboratory test results showed dyslipidemia and his family records suggested familiar (hereditary) dyslipidemia which affected his mother and sister. 1-month follow-up echocardiography showed a drastic improvement of LVEF by roughly 15%. The combination of revascularization, stem cell therapy, and lipid-lowering therapy has shown a good therapeutic effect.

Keywords: STEMI in young patients, familial dyslipidemia.

I. INTRODUCTION

ST-elevation myocardial infarction (STEMI) is most commonly caused by a complete occlusion of a coronary artery due to acute plaque rupture or thrombosis, resulting in the transmural myocardial infarction. We discuss a case of the young male patient with an acute STEMI followed shortly by an episode of cardiac arrest who was successfully resuscitated and underwent urgent percutaneous coronary intervention (PCI). Primary (hereditary) dyslipidemia was the most probable risk factor resulting in STEMI.

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II. CASE PRESENTATION

A 30-year-old male with no remarkable medical records visited to our hospital with typical angina and dyspnea that lasted for 20 minutes. Initial ECG showed peaked T waves in precordial leads V3-V5, no noticeable ST elevation (image 1).

During the examination, he suffered a sudden loss of consciousness and pulse, the monitor showed ventricular fibrillation. Advanced resuscitation including electrical cardioversion was performed to good effect. 20 minutes later, we had his spontaneous circulation restored. Emergency echo cardiography (ECG) then showed apparent ST-elevation from V2 to V6 leads consistent with the diagnosis of anterolateral infarction (image 2).

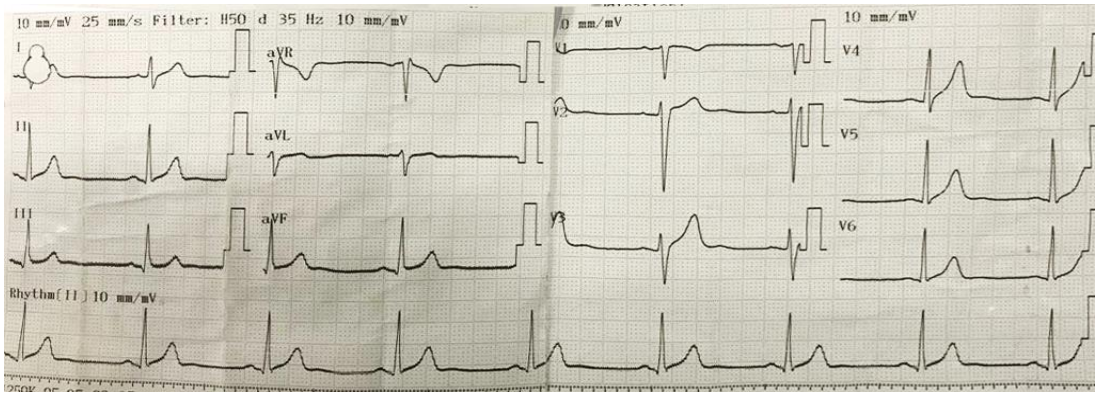

Image 1. ECG at initial examination

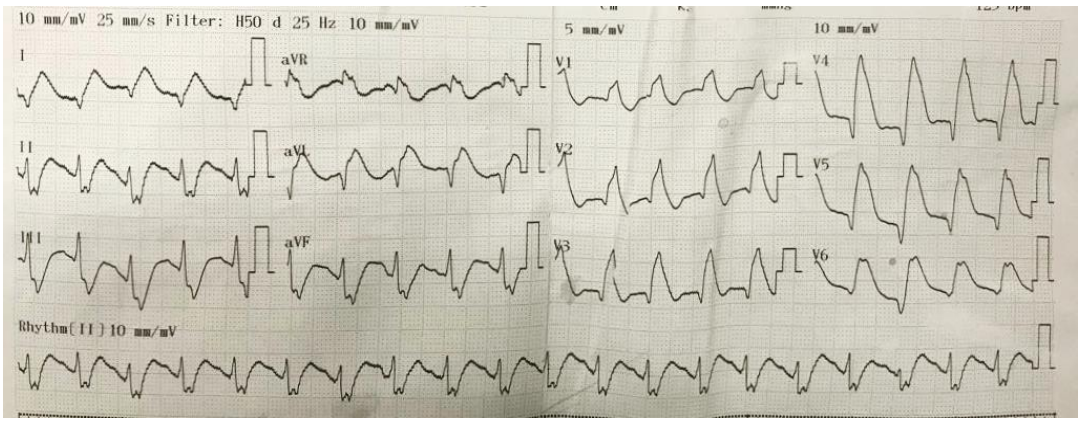

Image 2. Emergency ECG after VF and spontaneous circulation was restored

The patient was immediately transferred to the coronary intervention unit after appropriately loaded with aspirin and ticargrelor following 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC).[10]

Coronary angiogram showed severe three-vessel lesions including total occlusion of left anterior descending artery (LAD) and 80% stenosis of right coronary artery (RCA) and left circumflex arteries (Lcx) (Image 3). The LAD occlusion was treated with angioplasty and stent deployment.

Post-operative ECG (image 4) still showed ST-elevation but to a lesser extent than previous ECG. Bedside echocardiogram showed clear signs of regional wall motion abnormality among which the septal and apical hypokinesis was observed. Left ventricular ejection fraction (LVEF) was estimated at 40%. Routine laboratory test results showed dyslipidemia with Cholesterol level at 4.21 mmol/L, HDL-C at 0.8 mmol/L, LDL-C at 2.6 mmol/L. His family records suggested familial (hereditary) dyslipidemia which afflict his mother and sister as well as himself.

The patient's condition rapidly improved, his blood pressure gradually stabilized with successful withdrawal from inotropes and vasopressors. He was discharged from the

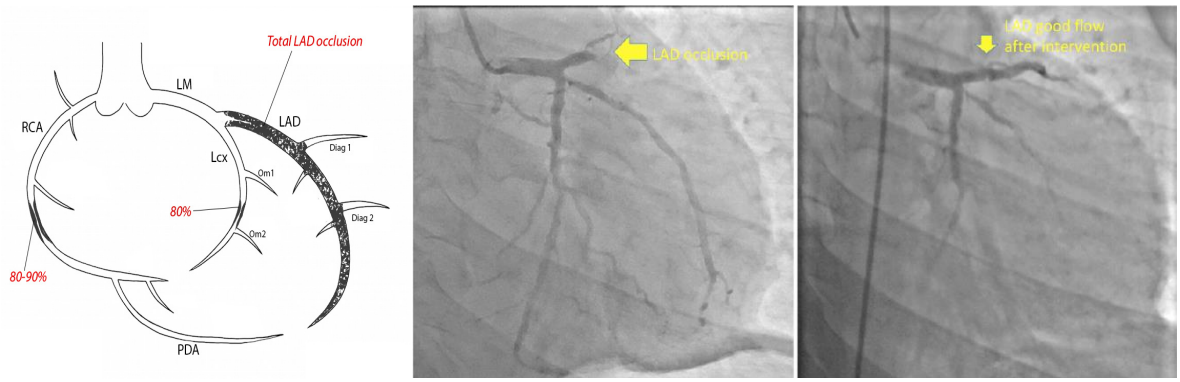

Image 3. Angiogram showed three-vessel lesions including total occlusion of LAD artery

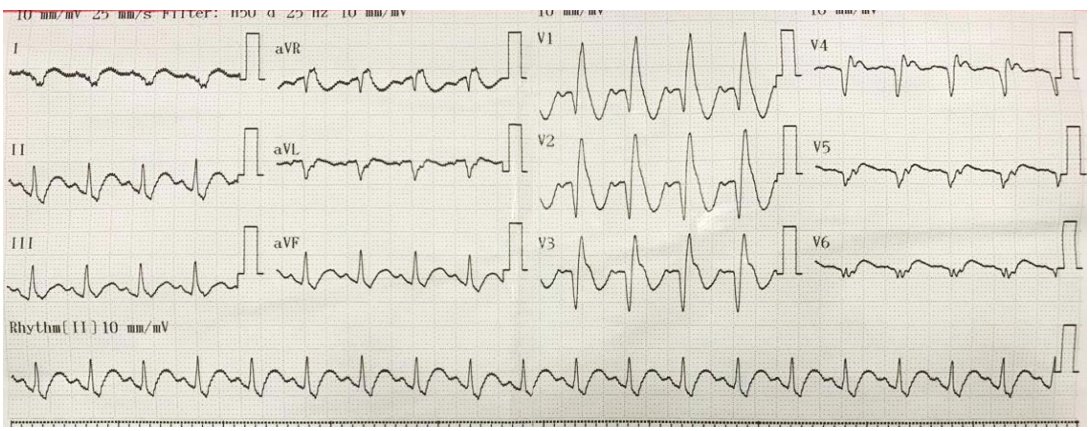

Image 4. Post-interventional ECG

hospital 6 days afterward and carried on regular treatment including antiplatelets and lipid lowering therapy. He was scheduled for a 1-month check-up for a secondary PCI. His 1-month checkup showed promising progress, his chest pain virtually disappeared and blood lipid levels were better controlled.

Secondary PCI was performed with another stent deployed in RCA-II. Coronary flow was good in the previously revascularised LAD artery.

III. DISCUSSION

Though less common, STEMI in young patients poses great challenges for every healthcare system. Epidemiological and angiographic characteristics of this group tend to differ from older patients, and so do in-hospital mortality, morbidity and prognosis.

Young adults were reported about 10 - 20% of STEMI patients, varying from studies.[1-3] Male patients, despite constituting the majority of both young and old patient groups, are markedly more prevalent in young group.[4]

According to previous and current studies, young STEMI patients have significantly higher prevalence of modifiable risk factors such as smoking, obesity and dyslipidemia.[1-3] Cigarette smoking, a common risk factor accountable for the development of coronary heart disease, was found in as high as 74% of STEMI patients aged 30 - 49, compared to only about 30% in older patients aged > 70.[5] Young STEMI patients also have a higher chance to have a

family history of coronary heart diseases than old ones.[1-4]

Our patient in this report leaded a quite healthy life, no obesity, no history of smoking, and no family record of coronary heart diseases. The only risk factor we suspected was dyslipidemia and lipid lowering therapy was applied immediately following the Task Force for the management of dyslipidemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS).[8]

Yet, our patient's clinical presentation and cardiac arrest suggested severe coronary lesions. Indeed, his angiographic findings were even more severe than what we at first had expected. There was a three-vessel lesion including complete occlusion of the LAD artery and 80 - 90% stenosis of the other two coronary branches. Statistically, angiographic characteristics are found to be more favorable in young patients with single vessel lesion constituting the majority of the group.[6]

This incidence raised some serious concern about screening for CAD risk factors in young adult people. In this case, did we missed something, or dyslipidemia was the only cause of catastrophic damage to the coronary arteries system?

Our patient's coronary arteries were revascularised using drug-eluting stents in LAD artery and subsequently RCA artery. Stem cell therapy was applied during the interventional process according to the recommendation for left ventricular ejection fraction < 40% treatment.[9] Initial results proved promising recovery, our patient's hemodynamic quickly stabilized, he regained consciousness shortly thereafter, and his chest pain gradually diminished.

Generally, a shorter hospital stay was noticed in young patients, along with lower in-hospital morbidity and mortality.[1] During the follow-up period, there was no remarkable difference in repeated PCI or re-infarction but overall mortality is significantly lower in young patients compared to their older counterparts.[1] Our patient recovered well from the infarction, which was consistent with the literature on young STEMI cases. The stem cell therapy proved to be beneficial, 1-month follow-up echocardiography showed a drastic improvement of LVEF by roughly 15% (40% -> 55%). This result was vastly encouraging and even more optimistic than current studies which estimate the improvement of LVEF by stem cell therapies at 8.5% at 4 month post myocardial infraction to as high as 12% at one year.[7]

IV. CONCLUSION

Coronary heart disease can easily be overlooked in young patients, yet they can present with horrid clinical characteristics and angiographic findings. Prevalent risk factors among young patients including smoking, family history and dyslipidemia. However, young STEMI patients with healthier lifestyle aren't necessarily subject to less severe coronary lesion. Regardless of age, it's essential for any STEMI patients to be quickly diagnosed and carefully monitored for complications such as ventricular fibrillation. Angiogram along with angioplasty and revascularization should be performed as soon as possible so that more favorable outcomes can be achieved. Post-MI rehabilitation and intensive lipid control should always be the top priority for the patients. Stem cell therapies proved their value and should be more extensively applied to patients with ischemic cardiomyopathy.

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