Acute Myocardial Infarction in a Young Adult with Coronary Artery Ectasia Presumably Caused by Kawasaki Disease: The Role of Thrombosuction

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INTRODUCTION

Kawasaki disease (KD) is an acute systemic inflammatory vasculitis involving medium-sized vessels with a marked predilection for the coronary arteries. It occurs predominantly in infants and young children. Although normally self-limiting in childhood, KD can extend into adulthood if left untreated. The etiology of KD is unknown. Symptoms include acute vasculitis, skin rash, fever, skin desquamation, oral mucositis, conjunctivitis and cervical lymphadenopathy. Patients with KD are at increased risk for accelerated atherosclerosis and acute myocardial infarction (AMI) in adolescence and adulthood.

Direct percutaneous coronary intervention (PCI) for acute myocardial infarction (AMI) is now the standard first-line therapy for all patients. However, few studies on PCI in young patients with AMI and Kawasaki disease have been published. Herein, we report a case of AMI in a 26-year-old man with a history of Kawasaki disease. Emergency coronary angiography showed a thrombotic occlusion of the ectatic left circumflex artery. PCI with aspiration thrombectomy alone was performed successfully. Restenosis was not observed on coronary arteriography at 6-month follow-up. Our report suggests that PCI with thrombosuction for young patients with AMI and Kawasaki disease can be safe and effective.

Key Words: Acute myocardial infarction • Coronary artery ectasia • Kawasaki disease • Percutaneous coronary intervention

CASE REPORT

A 26-year-old man in whom Kawasaki disease had been diagnosed at the age of 18 months presented to our emergency department because of sudden onset of chest pain after breakfast. He denied any previous history of hypertension. The patient did not have a history of smoking and did not abuse alcohol. On physical examination, his blood pressure was 154/104 mm Hg and his heart
rate was 62 beats/min. Chest and heart examinations revealed nothing unusual. A 12-lead electrocardiogram (ECG) revealed ST depression in leads V4-V6 (Figure 1A). Furthermore, elevated cardiac enzymes (peak levels: creatinine kinase/creatine kinase myocardial bound, 875/72.3 U/L) and elevated troponin-I level (2.5 ng/mL) were identified. The plasma levels of total cholesterol, triglyceride, and low-density lipoprotein cholesterol were 161, 121 and 88 mg/dL, respectively. Other biochemistry and blood tests were within normal limits. Echocardiogram showed normal left ventricular systolic function. Non-ST segment elevation AMI was diagnosed. Emergency coronary angiography showed ectasia of the proximal left anterior descending artery, and ectasia, mild calcification and near-total thrombotic occlusion of the proximal left circumflex artery (Figures 2A and 2B). Direct PCI with thrombosuction was successfully performed (Figure 2C). The ECG returned to normal (Figure 1B), and chest pain subsided after direct PCI. Although balloon angioplasty and stenting have been well established as safe and effective therapies in patients with AMI, thrombotic occlusion is commonly present at the site of the culprit lesion, and distal thrombus embolization after PCI remains a serious problem. We attempted only thrombus aspiration in this case because of typical intracoronary thrombus and the absence of significant stenosis of the site of the culprit lesion after resolution of thrombus. One hundred mg of aspirin and 2.5 mg of warfarin daily were prescribed at our outpatient clinic. Follow-up angiogram performed 6 months after the procedure revealed no restenosis (Figure 2E).

Figure 1. The 12-lead electrocardiograms (ECG) performed in the emergency department (A), and after percutaneous coronary angioplasty (B). At the emergency department, the ECG showed ST depression in leads V4-V6. After percutaneous coronary angioplasty, the ECG returned to normal.
Hartnell et al.\textsuperscript{4} used the term coronary artery ectasia (CAE) to define abnormal dilation of coronary segments one and a half-fold or more of the adjacent normal segment. Coronary artery dilation may be localized or diffuse with or without coronary artery stenosis. CAE is observed in 1.2 to 4.9\% of patients undergoing coronary angiogram, and has been thought to be congenital or acquired.\textsuperscript{5} The etiology and pathogenesis of this coronary enlargement is not very well known. However, extensive atherosclerotic changes and destruction of the media of the coronary artery vessels seem to play a role in the pathogenesis of CAE. Kruger et al.\textsuperscript{6} found that altered coronary flow in CAE may induce unstable angina and myocardial infarction.

**Figure 2.** (A) Left anterior cranial view of left coronary angiography, showing an aneurysm of the proximal left anterior descending artery. (B) Left anterior caudal view of left coronary angiography before aspiration thrombectomy and percutaneous coronary angioplasty (PCI). This image shows an aneurysm and mild calcification of the proximal to middle left circumflex artery, and near-total thrombotic occlusion of the middle left circumflex artery (arrowhead). (C) Left anterior caudal view of left coronary angiography after aspiration thrombectomy and PCI. Revascularization was successfully performed (arrowhead). (D) Left anterior oblique view of the right coronary artery. (E) Six-month follow-up left coronary angiography shows no restenosis of the left circumflex artery (arrowhead).
Acute myocardial infarction in young adults is very rare. The risk factors for coronary artery disease include male gender, age above 40 years, current smoking, diabetes, obesity, hypertension, hyperlipidemia and family history. In our patient, male gender was the only risk factor. The most possible cause of AMI in our patient was the coronary ectasia caused by Kawasaki disease. Patients with a history of Kawasaki disease are at increased risk for early-onset atherosclerosis, which in turn puts them at risk for young-onset AMI.

Kawasaki disease is an acute systemic inflammatory vasculitis that predominantly affects infants and young children. Approximately 20% to 30% of untreated patients with KD develop coronary artery ectasia or aneurysms, which may lead to myocardial infarction, sudden death, or chronic artery insufficiency in adulthood. In Kawasaki disease, coronary ectasia or aneurysms develop predominantly in the proximal segments and are classified as either local or giant (> 8 mm in diameter). The size of the ectasia or aneurysm is the most important predictor of myocardial infarction. Giant ectasia or aneurysms have a poor prognosis, do not regress and usually result in ischemic heart disease. In our patient, it is unknown when the ectasia developed. Since his KD was never treated in childhood, and the disease was not monitored, we suspect that the ectasia may have developed as a cardiovascular sequela of KD. Cardiovascular sequelae of Kawasaki disease may be an important cause of ischemic heart disease in young adults; therefore, prophylactic antiplatelet therapy is indicated and regular follow-up echocardiographic studies are recommended. Giant or multiple coronary artery ectasia and stenotic lesions are indications for coronary revascularization.

Export aspiration catheter (EAC) is one of the components of the GuardWire Plus system (PercuSurge, Sunnyvale, CA). Several studies demonstrated its efficacy during elective interventions, mainly on proximal lesions of coronary arteries without an angled takeoff. Wang et al. reported its successful utilization in 9 patients undergoing primary PCI in native coronary lesions. The advantage of this technique is its ease of performance without much time consumption in AMI patients. In our case, we could perform EAC with thrombolysis successfully without any complications.

Coronary artery sequelae of KD are known to be involved in the development of adult coronary artery disease and may be an important cause of AMI in young adults. Cardiologists should recognize this condition and include the sequelae of KD in the differential diagnosis of AMI in young adults. Based on our experience, direct PCI for AMI in patients with Kawasaki disease can be safe and effective.

REFERENCES