

# CORONARY ARTERY ANEURYSMS IN A YOUNG PATIENT WITH ACUTE MYOCARDIAL INFARCTION: A CASE REPORT

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Coronary artery aneurysms are not uncommon. They are usually arteriosclerotic in origin, and may be congenital or secondary to injury, dissection, infection, inflammation, or Kawasaki disease (KD). Herein, we report a case involving a 25-year-old male smoker with acute myocardial infarction (AMI). Coronary angiography showed triple-vessel disease, coronary artery aneurysms, and diffuse ectasia. Coronary artery bypass grafting was performed without complications. Based on his history, serologic examinations, and angiographic findings, we suspected that his coronary artery aneurysms and ectasia were the adult sequelae of KD. This case is a good reminder that KD victims may suffer from young-onset AMI.

**Key Words:** acute myocardial infarction, coronary artery aneurysm, Kawasaki disease  
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Coronary artery aneurysms are not uncommon, being found in 1.4% of necropsies performed in patients over the age of 16 years [1]. They are usually arteriosclerotic in origin [2], and may be congenital or secondary to injury, dissection, infection, or inflammation. Coronary artery aneurysm is an important complication of Kawasaki disease (KD) [3]. Herein, we describe the case of a 25-year-old male smoker who suffered from acute myocardial infarction (AMI) and who was found by angiography to have coronary artery aneurysm and diffuse ectasia.

## CASE PRESENTATION

This 25-year-old man presented with persistent chest pain.

There was nothing significant in his medical history and no previous episodes of chest pain. He could not recall any unusual or severe childhood illnesses. There was no family history of ischemic heart disease. However, he was a smoker. He was sent to our emergency room due to chest pain. Twelve-lead electrocardiogram (ECG) showed dynamic ST-T changes in leads I, aVL, and V3–V6 (Figure 1), and there was also a series of changes in cardiac enzymes (peak levels: creatinine kinase/creatinine kinase myocardial bound, 2,785/97.8 U/L; troponin I, 40.4 ng/mL). As the patient was thought to have Killip I non-ST segment elevation myocardial infarction (NSTEMI), he was admitted to our cardiac care unit. On admission, echocardiography showed left ventricular (LV) dilatation, LV systolic dysfunction (fraction shortening, 18%), mitral valve B hump, and LV posterior and apical wall hypokinesia (Figure 2). He received standard NSTEMI medical treatment, which relieved his chest pain.

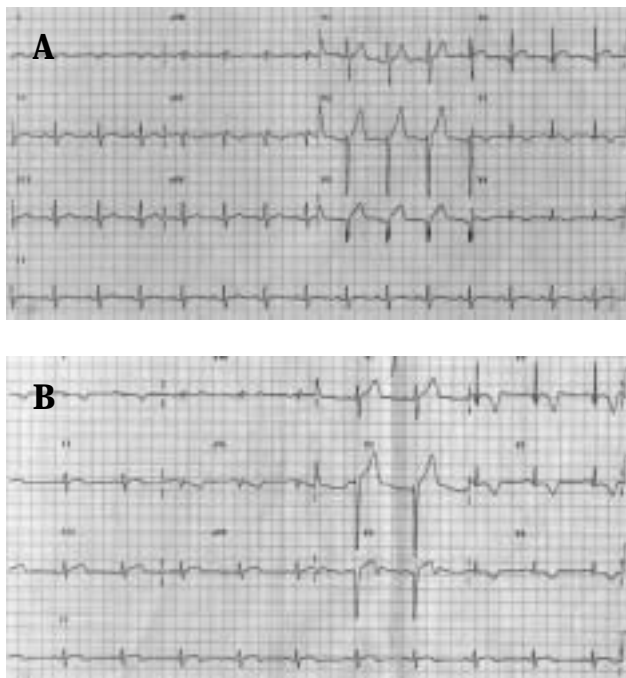
Two days after admission, coronary angiography was performed due to depressed LV function. Selective left coronary angiography showed three aneurysms involving the distal left main artery and the diagonal branch of the left anterior descending artery (LAD) joined by non-aneurysmal

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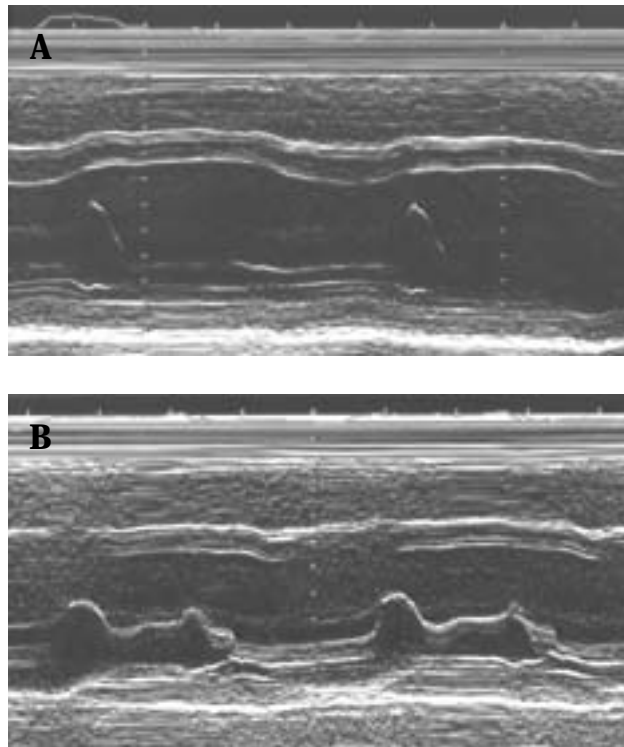
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**Figure 1.** Electrocardiograms in the: (A) emergency room, and; (B) on admission, show dynamic ST-T changes in leads I, aVL, and V3–V6.



**Figure 2.** Echocardiograms on admission show: (A) left ventricular dilation and depressed left ventricular function, and; (B) mitral valve B hump.

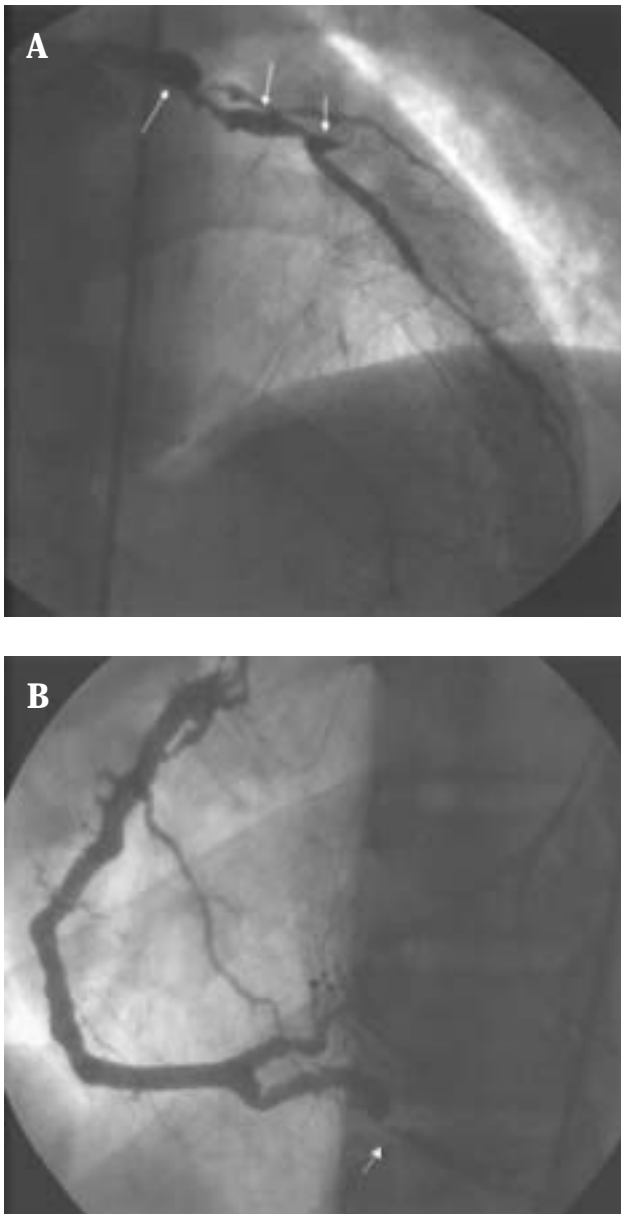
segments. The proximal LAD was occluded and its distal vessels filled backwards from the right coronary artery and the diagonal branch. The left circumflex artery (LCX) was occluded just behind its orifice and received collateral circulation from the diagonal branch. Selective right coronary angiography showed diffuse ectasia and 99% discrete stenosis over the posterior descending artery branch (Figure 3). Due to the occurrence of AMI and coronary aneurysms in a young patient, we performed a series of serologic tests, including hepatitis B surface antigen, venereal disease, lupus anticoagulant antibody, anti-cardiolipin antibody, and antinuclear antibody, all of which were negative. Serum lipid concentrations showed: total cholesterol, 172 mg/dL; low-density lipoprotein cholesterol, 93 mg/dL; high-density lipoprotein cholesterol, 62 mg/dL; and triglycerides, 71 mg/dL. Fasting sugar was 92 mg/dL.

Since coronary arteriography showed three-vessel coronary artery disease (CAD), and echocardiography revealed depressed LV function, we performed coronary artery bypass grafting (CABG). The LAD was grafted to the left internal mammary artery, and the diagonal branch, right posterior descending branch, and left obtuse margi-

nal branch were grafted with vein grafts. After surgery, the patient gradually recovered without event.

## DISCUSSION

It was difficult to determine the cause of our patient's coronary artery aneurysms and ectasia. Trauma, mycotic aneurysm, embolism, syphilis, dissection, inflammation, and congenital abnormalities could be excluded by his medical history and the results of serologic testing. Except for smoking, the patient had no other known risk factor for atherosclerosis. In addition, when aneurysms are associated with atherosclerosis, the overwhelming majority of cases have pronounced coronary artery stenoses [4]. Takahashi et al defined coronary artery aneurysms in patients with KD as either localized or extensive [5]. Based on their definition, extensive aneurysms involve more than one segment, and may be either ectatic (uniformly dilated) or segmented (having multiple dilated segments joined by normal or stenotic segments). In our patient, left coronary angiography showed segmented aneurysms (three aneurysms



**Figure 3.** Coronary angiograms. (A) 35° cranial angulation view shows three aneurysms (arrows) involving the distal left main artery and the diagonal branch of the left anterior descending artery. The left anterior descending artery and left circumflex artery are occluded. (B) 30° left anterior oblique view shows diffuse right coronary artery ectasia and 99% discrete stenosis over the posterior descending branch (arrow).

joined by non-aneurysmal segments), and right coronary angiography showed ectatic aneurysms. Such angiographic appearance is consistent with Takahashi et al's findings [5]. Although we found no childhood history of a Kawasaki-like illness in our patient, we suspected that KD, which started in childhood, was the cause of his coronary

artery aneurysms and ectasia. Our suspicion is partly supported by the appearance of our patient's aneurysms and ectasia, which do not typically occur in atherosclerosis [6], but bear a notable resemblance to some of the lesions found in KD [3,5,7,8].

KD is an acute vasculitis of unknown etiology that occurs predominantly in infants and young children. Kawasaki first described the illness in Japan in 1967 [9]. Symptoms of KD include fever, bilateral non-exudative conjunctivitis, erythema of the lips and oral mucosa, changes in the extremities, rash, and cervical lymphadenopathy. Approximately 15% to 25% of untreated children with KD develop coronary artery aneurysms or ectasia, which may lead to myocardial infarction, sudden death, or chronic coronary artery insufficiency [10]. Treatment with intravenous gamma globulin in the acute phase reduces the risk of coronary artery aneurysm by three- to fivefold [11]. KD sometimes remains subclinical in the acute phase or may not be recognized because of the nonspecific features, and may present at a later date with cardiac sequelae [12].

We suggest that what happened in our patient was that, after the unrecognized childhood occurrence of KD, coronary artery aneurysms and ectasia were formed, leading to the formation of thrombus and occlusion within his coronary arteries and a silent myocardial infarction. This sequence of events is supported by the echocardiographic findings of depressed LV function and dilated LV chamber. This time, thrombus occlusion probably occurred in his LCX, as suggested by 12-lead ECG (dynamic ST-T changes in leads I, aVL, and V3–V6). This occlusion led to his symptomatic AMI.

The management of coronary artery stenoses in KD is principally surgical, although percutaneous coronary intervention has been used in patients with isolated, discrete stenoses [13–15]. The surgical options consist of either CABG or cardiac transplantation. In the case of coronary insufficiency related to KD, coronary revascularization using the saphenous vein, internal mammary arteries, and a combination of both types of grafts has been performed with considerable success [16,17]. In our case, due to severe three-vessel CAD and depressed LV function, CABG seemed the best option and was performed successfully.

We believe that our patient's AMI, coronary artery aneurysms, and ectasia were a consequence of KD, which he had had since childhood. Since KD may cause CAD in young adults, cardiologists should keep in mind and include the sequelae of KD in the differential diagnosis of early-onset ischemic heart disease.

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# 年輕型急性心肌梗塞與冠狀動脈瘤 — 病例報告

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冠狀動脈瘤並非罕見，它們通常是動脈粥狀硬化所造成，但也可能是先天性的，或是因冠狀動脈受傷、剝離、感染、或發炎後所產生，另外也有可能是川崎病的後遺症所引起。這裡，我們報告一位 25 歲的年輕男性因急性心肌梗塞而住院。他除了抽煙外無其他動脈硬化的危險因子。冠狀動脈攝影顯示三條冠狀動脈疾病，冠狀動脈瘤和冠狀動脈擴張。他之後接受成功的冠狀動脈繞道手術治療。根據他的病史、抽血檢查和冠狀動脈攝影的結果，我們高度地懷疑他的冠狀動脈瘤和冠狀動脈擴張是因其小時後感染川崎病的後遺症所致。這也提醒我們川崎病的患者可能罹患年輕型的心肌梗塞。

**關鍵詞：**急性心肌梗塞，冠狀動脈瘤，川崎病  
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