

Case Report

Acute Myocardial Infarction in a Patient with Coronary Artery Aneurysm and Crohn's Disease

APOSTOLOS CHRISTOU, SOTIRIOS PATSILINAKOS, IOANNA CHINOFOTI, ATHANASIOS MARINAKOS, NIKOLAOS NIKOLAOU, STAVROS SPANODIMOS

Cardiology Department, Konstantopoulou General Hospital, Athens, Greece

Key words: Coronary artery aneurysm, Crohn's disease.

Crohn's disease is a chronic inflammatory disorder of unknown cause involving the gastrointestinal tract. Complications from the cardiovascular system seem to be uncommon in patients with Crohn's disease. We present a case of a 37-year-old man with a known history of Crohn's disease, who was admitted to our hospital with acute myocardial infarction. An aneurysm of a totally occluded circumflex coronary artery was revealed during the attempt at primary intervention. The artery was successfully opened and the aneurysm was sealed with the use of 2 covered stents.

Manuscript received:
April 9, 2010;
Accepted:
December 15, 2010.

Address:
Apostolos H. Christou

20 Argiroupoleos St.
142 31 Nea Ionia
Athens, Greece
e-mail: christouapostolos@yahoo.com

A coronary artery aneurysm (CAA) is defined as the dilatation of a coronary artery that exceeds the diameter of normal adjacent segments or the diameter of the patient's largest coronary vessel by 1.5 times. This is an uncommon disease, which is now being increasingly diagnosed because of the evolution of coronary angiography. The incidence varies from 1.5% to 5%, with male dominance and a predilection for the right coronary artery.¹ In adults, CAA is predominantly atherosclerotic in origin; however, other causes include Kawasaki disease, autoimmune disease, trauma, infection, dissection, congenital malformation, and angioplasty.² Recently, with the advent of drug-eluting stents, there are increasing reports that stents may cause CAA months or years after the procedure.^{3,4}

Crohn's disease is a chronic inflammatory disorder of unknown cause involving the gastrointestinal tract. Complications from the cardiovascular system seem to be uncommon in these patients, but there have been no systematic investigations concerning the epidemiology of these manifestations. Pericarditis

and perimyocarditis have been reported in patients with inflammatory bowel disease. Some patients developed thrombotic complications via activation of the coagulation system, which can result in atrial thrombi, pulmonary embolism and myocardial infarction. In addition, a few cases of atrioventricular block, amyloidosis of the heart, dilated cardiomyopathy and endomyocardial fibrosis have been reported in patients with chronic inflammatory bowel disease.⁵ The aorta can also be involved in Crohn's disease. Aortic regurgitation, aortic aneurysm, branch vessel occlusion, aortic mural thrombus and aortic dissection could be caused because of the associated aortitis.⁶ CAA formation has not yet been reported in patients with Crohn's disease.

Case presentation

A 37-year-old man with a 7-year history of Crohn's disease presented to the emergency department complaining of acute chest pain radiating to both arms for the last 1 hour. He was a smoker (about 30 pack-years) with a history of hyperlipi-

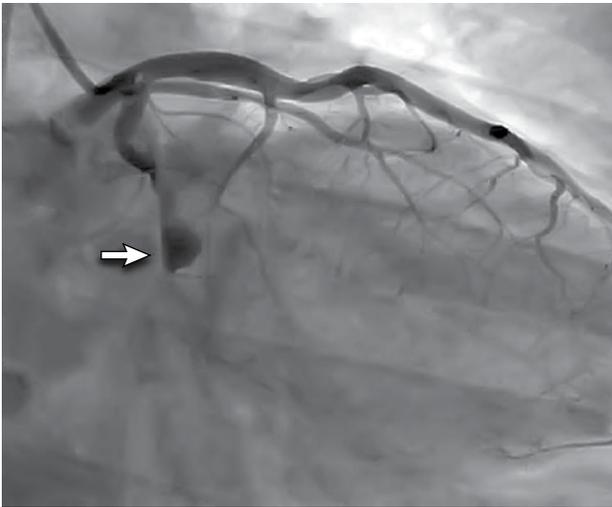


Figure 1. Coronary aneurysm in the circumflex artery (6 × 25 mm), beyond which the vessel was totally obstructed.

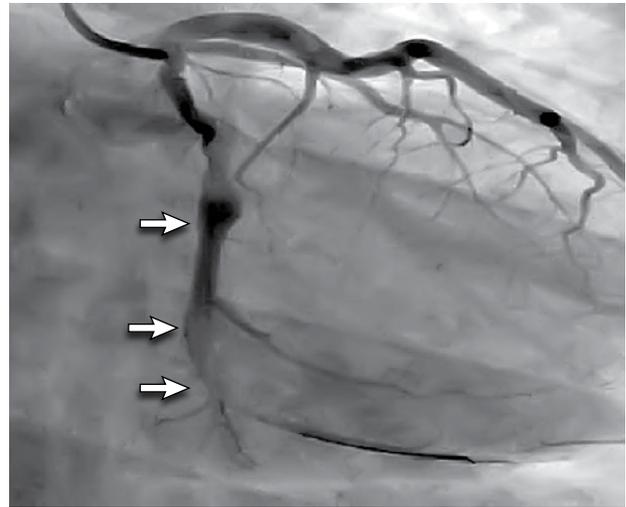


Figure 2. The angiographic result immediately after the exclusion of the coronary aneurysm with 2 covered stents. A significant stenosis was revealed immediately after the aneurysm.

daemia. A 12-lead electrocardiogram revealed an inferior-lateral ST-elevation acute myocardial infarction. The patient was referred to the catheterisation lab for primary percutaneous coronary intervention (PCI). The angiography showed a totally occluded circumflex artery at the site of a large aneurysm, with a large amount of thrombotic material (Figure 1). The diameter of the vessel proximally to the aneurysm was 3.3 mm, while the aneurysm's diameter was about 6 mm. An ectatic right coronary artery (at its proximal part) with no significant lesions was also revealed. The left anterior descending artery also had no lesions.

We decided to open the occluded artery and try to seal the aneurysm. The aneurysm was sealed with the use of 2 covered stents (Jostent Graftmaster 3.5 × 16 mm), because a longer covered stent was not available (Figure 2). PCI was completed with the implantation of a drug eluting stent (Endeavor resolute 2.75 × 24 mm) distally to the graft stents, with an optimal immediate result. A thrombus aspiration device was used many times during the procedure in order to remove thrombotic debris and prevent the no-reflow phenomenon. An excellent angiographic result was finally achieved (Figure 3). Evaluation of left ventricular function showed an ejection fraction >55% with mild hypokinesia of the basal inferior wall.

Until the 1-year follow up examination the patient remained asymptomatic with almost normal left ventricular function, receiving dual antiplatelet therapy (aspirin 100 mg and clopidogrel 75 mg daily).

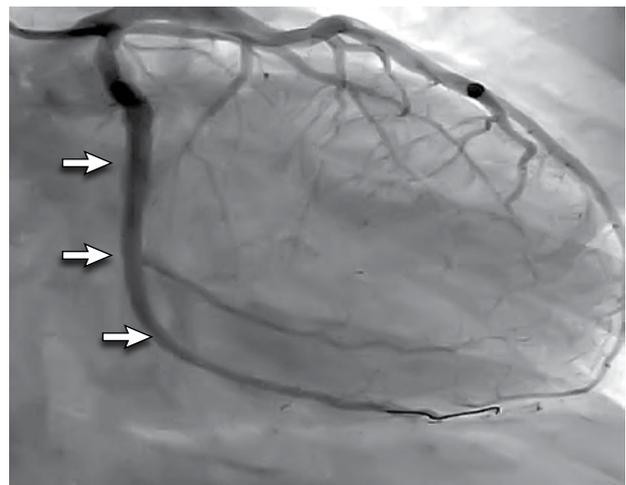


Figure 3. The final angiographic result. A drug-eluting stent was implanted in the stenosis distally to the graft stents.

Discussion

Cardiac and vascular involvement of Crohn's disease is only rarely encountered clinically, but until now there have been no reports of patients with Crohn's disease and coronary aneurysms. Some patients with Crohn's disease suffer from vasculitis, representing a further mechanism of inflammatory disease of the cardiovascular system. Coronary dilatation has been described in association with other diseases causing vasculitis, such as scleroderma,⁷ Ehlers Danlos syndrome,⁸ different types of antineutrophil cytoplasmic antibody (ANCA)-related vasculitis,⁹ syphilitic aor-

titis,¹⁰ and Kawasaki disease.¹¹ There are also some case reports showing a combination of Takayasu's arteritis and Crohn's disease, in which cross-reacting antibodies against gut mucosa and aortic tissue were found. In our case, an inflammatory endarteritis could have caused destruction and fibrosis of media and thus weakness of the arterial wall predisposing to aneurysm formation.¹²

The natural history and prognosis of CAA have not been delineated. Most patients are asymptomatic. Thromboemboli and sudden cardiac death with acute rupture have been reported in association with coronary artery aneurysm. Patients with aneurysmal disease have a greater incidence of documented myocardial infarction. However, patients with aneurysmal disease and non-significant coexistent obstructive lesions did not have a greater incidence of infarction.¹³ More recent studies showed that coronary aneurysms are an independent predictor of mortality. Overall 5-year survival in such patients was only 71%.¹⁴

In our patient, angiography was performed during primary PCI. The coronary angiogram revealed a CAA in the circumflex artery followed by an obstructive lesion. The right coronary artery was also ectatic. There was no evidence of underlying disease such as antiphospholipid syndrome, rheumatic or connective tissue disorders. Several different therapeutic approaches have been proposed for the management of myocardial infarction in patients with CAA.¹⁵ Some authors recommend medical treatment, while others favour surgery. The therapeutic strategy for the acute phase of ST elevation myocardial infarction includes administration of fibrinolytic therapy or primary PCI. Angioplasty of stenoses associated with aneurysmal coronary disease has been performed with success.¹⁶ Recently, coronary stenting and sealing of the aneurysm with covered stents has played an increasingly important role in the treatment of CAA.¹⁷ In our case the aneurysm was found to be full of thrombotic material and there was a risk of downstream microvascular embolisation. Based on our belief that CAA presenting with a myocardial infarction should be aggressively managed, in order to prevent recurrent ischaemic incidents due to the aneurysm, we decided to proceed with the repair of the aneurysm with covered stents. The result fulfilled our expectations, since the performance of the left ventricle was preserved. How-

ever, the therapeutic approach to these patients remains under discussion.

References

- Nichols L, Lagana S, Parwani A. Coronary artery aneurysm: a review and hypothesis regarding etiology. *Arch Pathol Lab Med.* 2008; 132: 823-828.
- Robinson FC. Aneurysms of the coronary arteries. *Am Heart J.* 1985; 109: 129-135.
- Aoki J, Kirtane A, Leon MB, Dangas G. Coronary artery aneurysms after drug-eluting stent implantation. *JACC Cardiovasc Interv.* 2008; 1: 14-21.
- Alfonso F, Pérez-Vizcayno MJ, Ruiz M, et al. Coronary aneurysms after drug-eluting stent implantation: clinical, angiographic, and intravascular ultrasound findings. *J Am Coll Cardiol.* 2009; 53: 2053-2060.
- Rellecke P, Strauer BE. Chronic inflammatory bowel disease and cardiovascular complications. *Med Klin (Munich).* 2006; 101 Suppl 1: 56-60.
- Augoustides JG, Pochettino A, Pyeritz RE. Successful surgical management of acute type A aortic dissection associated with Crohn disease. *J Thorac Cardiovasc Surg.* 2007; 134: 1048-1049.
- Tarek el-G, Yasser AE, Gheita T. Coronary angiographic findings in asymptomatic systemic sclerosis. *Clin Rheumatol.* 2006; 25: 487-490.
- Imahori S, Bannerman RM, Graf CJ, Brennan JC. Ehlers-Danlos syndrome with multiple arterial lesions. *Am J Med.* 1969; 47: 967-977.
- Mavrogeni S, Manoussakis MN, Karagiorga TC, et al. Detection of coronary artery lesions and myocardial necrosis by magnetic resonance in systemic necrotizing vasculitides. *Arthritis Rheum.* 2009; 61: 1121-1129.
- Davidson A, Eshaghpour E, Young N, Mintz GS. Late thrombosis of a coronary artery mycotic aneurysm. *Am Heart J.* 1991; 121: 1549-1550.
- Hiraishi S, Yashiro K, Oguchi K, Kusano S, Ishii K, Nakazawa K. Clinical course of cardiovascular involvement in the mucocutaneous lymph node syndrome. Relation between clinical signs of carditis and development of coronary arterial aneurysm. *Am J Cardiol.* 1981; 47: 323-330.
- Farrant M, Mason JC, Wong NA, Longman RJ. Takayasu's arteritis following Crohn's disease in a young woman: any evidence for a common pathogenesis? *World J Gastroenterol.* 2008; 14: 4087-4090.
- Swaye PS, Fisher LD, Litwin P, et al. Aneurysmal coronary artery disease. *Circulation.* 1983; 67: 134-138.
- Baman TS, Cole JH, Devireddy CM, Sperling LS. Risk factors and outcomes in patients with coronary artery aneurysms. *Am J Cardiol.* 2004; 93: 1549-1551.
- Mavrogeni S. Coronary artery ectasia: from diagnosis to treatment. *Hellenic J Cardiol.* 2010; 51: 158-163.
- Ochiai M, Yamaguchi T, Taguchi J, et al. Angioplasty of stenoses adjacent to aneurysmal coronary artery disease. *Jpn Heart J.* 1990; 31: 749-757.
- Silva JC, Lopes R. Percutaneous exclusion of a giant coronary artery aneurysm using two covered stents. *J Invasive Cardiol.* 2009; 21: E119-121.