

Coronary artery spontaneous dissection in a young male heavy smoker during bed rest

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Abstract

Spontaneous dissection of coronary artery (SDCA) is an extremely infrequent cause of acute cardiac ischaemic manifestations or sudden cardiac death with complex pathophysiology. This condition mostly affects young women in association with peripartum or postpartum status with no known risk factors for cardiovascular disease although some correlations have been noted with connective tissue disorders contraceptive use or intense physical activity. Herein, we report a case of spontaneous dissection of the left anterior descending artery during bed rest in a 24-year-old young man who had no risk factors except smoking or family history of coronary artery diseases.

Key words: acute coronary syndrome, smoking, coronary, dissection.

Introduction

Spontaneous dissection of coronary artery (SDCA) is an uncommon entity and can be observed in conditions from unstable angina to acute coronary syndrome, fatal arrhythmias to sudden cardiac death that should be considered during the evaluation of patients who present with chest pain. Several diseases or conditions such as atherosclerosis, pregnancy, connective tissue disorders, intensive exercise, illicit drugs misuse or oral contraceptive use have been associated with spontaneous dissection of coronary artery [1-2]. Coronary angiography is essential for early management and frequently used in the evaluation of patients with acute ischemic manifestations of coronary artery diseases. Furthermore, non-invasive coronary angiography by multidetector computed tomography (MDCT) has been used for evaluation of long-term follow-up of patients with SDCA. There is no agreement on the way of treatment including medical therapy, interventional treatment or surgery [1]. We report

Streszczenie

Samoistne rozwarstwienie tętnicy wieńcowej jest niezwykle rzadką przyczyną ostrych przejawów niedokrwienia serca lub nagłej śmierci sercowej o skomplikowanej patofizjologii. Schorzenie to dotyczy głównie młodych kobiet; może wystąpić w związku z okresem okołoporodowym i poporodowym bez zdiagnozowanych czynników ryzyka dla chorób układu krążenia, chociaż odnotowano pewne korelacje związane z chorobami tkanki łącznej, stosowaniem środków antykoncepcyjnych oraz intensywnym wysiłkiem fizycznym. W niniejszej pracy przedstawiono przypadek samoistnego rozwarstwienia gałęzi międzykomorowej przedniej lewej tętnicy wieńcowej w czasie spoczynku u 24-letniego mężczyzny, który nie był obciążony innymi czynnikami ryzyka niż palenie czy wywiad rodzinny w kierunku chorób tętnic wieńcowych.

Słowa kluczowe: ostry zespół wieńcowy, palenie, rozwarstwienie tętnicy wieńcowej.

a perplexing case of spontaneous dissection of left anterior descending artery during bed rest in a 24-year-old healthy young man who had no risk factors except heavy smoking or family history of coronary artery diseases.

Case study

A 24-year-old heavy smoker male was admitted to our emergency department because of severe sudden onset sub-sternal chest pain radiating to left arm that woke him up in the night at bed rest at 03:00 AM. He smoked cigarettes, one and a half packets per day for 6 years, but had no other risk factors for atherosclerosis. At this presentation, his electrocardiogram showed ischemic changes in anterior and lateral leads (D₁, AVL, and V₁₋₆). Initial laboratory tests including complete blood count, electrolytes, renal and liver functions were within normal limits. Later his cardiac enzymes were elevated with peak troponin of 18.4 ng/ml (reference range, < 0.03 ng/ml) and creatinine kinase MB

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fraction of 53 ng/ml (reference range < 5 ng/ml). Transthoracic echocardiography showed left ventricular regional wall motion abnormalities (hypokinesia of the apico-septal and anterior segments) and ejection fraction was less than 45%. Acute myocardial infarction was suspected and the patient was immediately scheduled for coronary angiography. Coronary angiography was performed at 07:00 AM. His coronary angiography demonstrated a left dominant circulation and the left anterior descending (LAD) artery showed extensive dissection with visible tear from the middle part of the vessel to the first diagonal branch (Fig. 1A). There was TIMI 3 grade flow into the LAD artery. There was also no sign regarding intravascular thrombus formation. Medical treatment was chosen because of unknown origin of the proximal intimal tear. Invasive treatment (such as stent or intravascular nitroglycerine) was not considered because the patient's hemodynamic parameters were in normal ranges. Anticoagulant with heparin and anti-ischemic therapy with intravenous nitrates and β -blocking drugs was preferred in coronary intensive care unit. The clinical course was uneventful and repeated angiography on day 9 demonstrated spontaneous healing of the dissection of LAD artery (Fig. 1B). He was asymptomatic, and with cardiac enzyme levels trending downward. Rheumatology consultation confirmed no connective tissue disorders. The patient could be discharged for cardiac rehabilitation 11 days after admission. Aspirin, clopidogrel, and atorvastatin and β -blocker therapy was administered to his therapy after walking in the second floor. After 1 month, transthoracic echocardiography was repeated and showed left ventricular wall motion abnormality (hypokinesia only septal segments) and ejection fraction was 52%. Subsequent multidetector CT (MDCT) revealed normal coronary circulation and spontaneous healing (Fig. 2A). An extraluminal lesion

was evident throughout the LAD artery, apparently compressing the true space of the lumen (Fig. 2B-D).

Discussion

SDCA is an extremely rare cause of acute cardiac ischemic manifestations or sudden cardiac death with an incidence of 0.1% for patients who are referred for coronary angiography [1-3]. Pregnancy, oral contraceptive use, intensive exercise, isolated fibromuscular dysplasia, chest trauma, illegal drug abuse, immunosuppression (cyclosporine), Marfan and Ehlers-Danlos syndromes, and some inflammatory diseases (for example, sarcoidosis, Kawasaki, and systemic lupus erythematosus) have been shown to be associated with SDCA [1-4]. In the different of cases, an essential condition, which may lead to SDCA, cannot be identified at all and it is consequently classified as idiopathic, although there is a weak association with smoking and excessive wall tension [5]. Smoking appears to be the main risk factor associated with coronary vasospasm in the patients without significant angiographic coronary stenosis [6].

In this case, the patient had no risk factors except smoking or family history of coronary artery diseases? In the anamnesis, he stated that he had gone to sleeping after smoking. Maybe heavy smoking causes vasospasm that may increase the shear stress, leading to SDCA. In relation to vasospasm, coronary dissection has been reported in cocaine use [1]. The principal effects of cocaine are mediated by α -adrenergic stimulation, which causes an increase in myocardial O_2 demand and a reduction in O_2 supply because of coronary vasoconstriction. Coronary angiography is decisive in the diagnosis of SDCA although other imaging modalities such as computed tomography coronary angiography and intravascular ultrasound might increase the diagnostic success [7]. In this case, we concluded that the

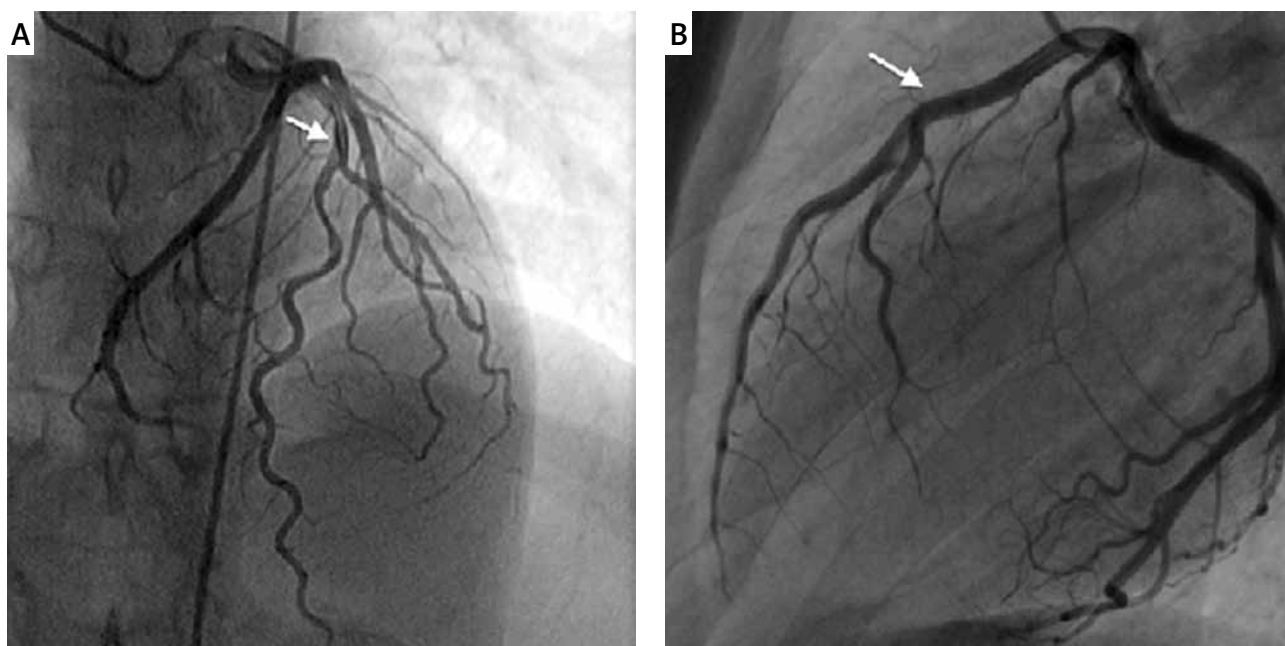


Fig. 1. Coronary angiography showing a dissection of the middle part of the left anterior descending artery extending to the first diagonal branch (arrow) (A), and nine days later without signs of dissection (arrow) (B)

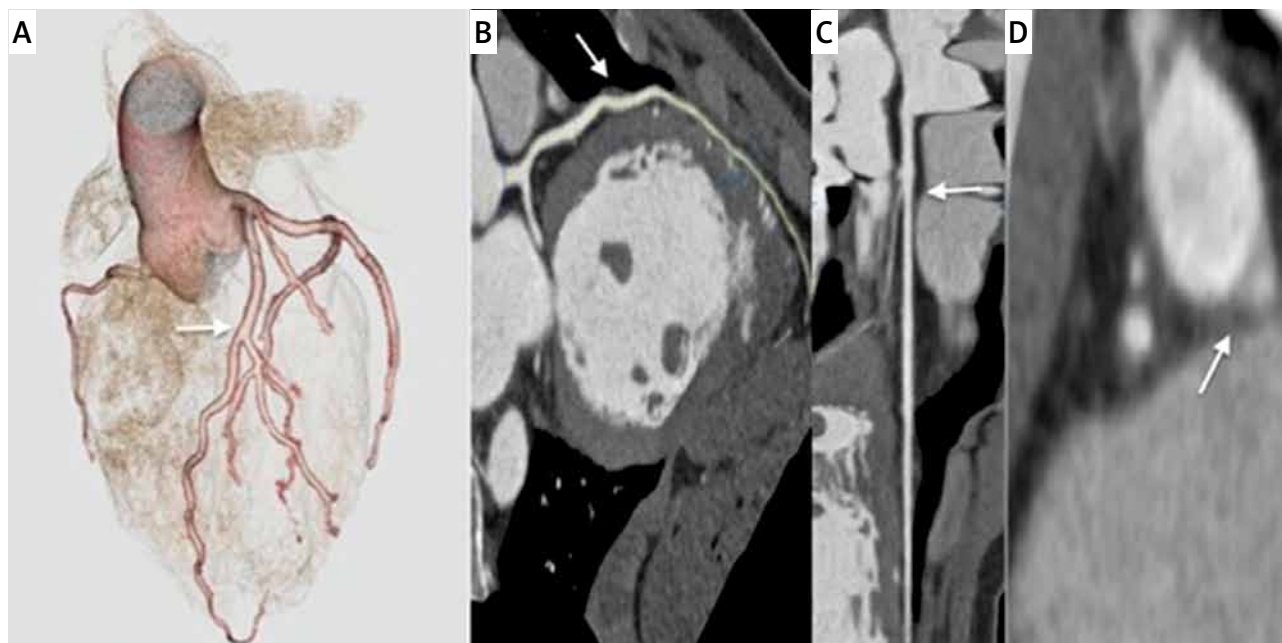


Fig. 2. CT coronary angiography 3D-volume-rendered reconstruction shows normal coronary arteries with left dominance and arrow shows spontaneous healing (A). Multiplanar reconstruction image of the LAD. Thick extraluminal hematoma (shown by arrow) was noted throughout the LAD in the subadventitial space (B). Arrow shows compression of the lumen and mild LAD narrowing (C). Cross section image of LAD (corresponding to the arrow in C), arrow shows compression of the lumen by an extraluminal lesion, further supporting the idea that the lesion was a dissecting hematoma (D)

LAD – left anterior descending artery, CT – computed tomography

culprit coronary artery was LAD artery, because apico-septal wall hypokinesia was detected on echocardiography. On the initial coronary angiography, dissection of the mid LAD artery was detected. Treatment options for SDCA include medical therapy, interventional treatment, or coronary artery bypass graft surgery [3, 7]. There are no randomized studies about the treatment of SDCA, but when the involved vessel is small and there is no evidence of persistent ischemia or hemodynamic instability, medical therapy can be chosen. Because of these reasons, this patient was treated conservatively. Medical treatment (anticoagulant with heparin and anti-ischemic therapy with intravenous nitrates and beta-blocking drugs) was preferred because his hemodynamic status was normal and there was good flow (TIMI 3) in distal part of the LAD artery. These reasons let us to wait for any invasive or surgical procedures.

In conclusion, to our knowledge, this is the first report of an obvious relationship between smoking and spontaneous dissection of coronary artery during bed rest in a young male. Heavy smoking in young adults may be associated with association of coronary artery spasm and this condition may cause spontaneous dissection of coronary artery without any other cardiac risk factors or conditions.

Disclosure

Authors report no conflict of interest.

References

- Schmid J, Auer J. Spontaneous coronary artery dissection in a young man – case report. *J Cardiothorac Surg* 2011; 6: 22.
- Evangelou D, Letsas KP, Korantzopoulos P, Antonellis I, Sioras E, Kardaras F. Spontaneous coronary artery dissection associated with oral contraceptive use: a case report and review of the literature. *Int J Cardiol* 2006; 112: 380-382.
- Maeder M, Ammann P, Angehrn W, Rickli H. Idiopathic spontaneous coronary artery dissection: incidence, diagnosis and treatment. *Int J Card* 2005; 101: 363-369.
- Capuano C, Sesana M, Predolini S, Leonzi O, Cuccia C. Literature review: spontaneous coronary artery dissections. *Cardiovasc Revasc Med* 2006; 7: 231-233.
- Dhawan R, Singh G, Fesniak H. Spontaneous coronary artery dissection: the clinical spectrum. *Angiology* 2002; 53: 89-93.
- Sugiishi M, Takatsu F. Cigarette smoking is a major risk factor for coronary spasm. *Circulation* 1993; 87: 76-79.
- Tweet MS, Hayes SN, Pitta SR, Simari RD, Lerman A, Lennon RJ, Gersh BJ, Khambatta S, Best PJ, Rihal CS, Gulati R. Clinical features, management, and prognosis of spontaneous coronary artery dissection. *Circulation* 2012; 126: 579-588.