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A rare cause of cardiac arrest: a case of an extensive left coronary artery spontaneous dissection

Causa rara de parada cardíaca: um caso de extensa dissecação espontânea da artéria coronária esquerda

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ABSTRACT – A 28-year-old male with a previous history of drug abuse was sent to an emergent coronary angiography, after a cardiac arrest, with a post-resuscitation electrocardiogram showing ST-segment elevation from V1-V4. Angiography showed multivessel and multisegment spontaneous coronary artery dissection. Due to clinical instability, patient underwent left anterior descending artery percutaneous coronary intervention. Prevalence of spontaneous coronary artery dissection as the cause of acute coronary syndrome is anecdotal in men. Yet, in the right scenarios as in this case, it must be ruled out. Cardiorespiratory arrest is an uncommon presentation of spontaneous coronary artery dissection and percutaneous coronary intervention in spontaneous coronary artery dissection is still a matter of debate.

Keywords: Spontaneous coronary artery dissection; Myocardial infarction; Heart arrest; Substance-related disorders; Coronary angiography; Vascular diseases

RESUMO - Um homem de 28 anos com história pregressa de abuso de drogas foi encaminhado para coronariografia de emergência após parada cardíaca. O eletrocardiograma pós-ressuscitação mostrou elevação do segmento ST em V1-V4. A angiografia mostrou dissecação espontânea da artéria coronária, multiarterial e em diversos segmentos. Devido à instabilidade clínica, o paciente foi submetido à intervenção coronária percutânea da artéria descendente anterior. A prevalência da dissecação espontânea da artéria coronária como causa de síndrome coronariana aguda em homens é infrequente. No entanto, nos casos suspeitos, ela deve ser excluída. A parada cardiorrespiratória é um quadro incomum na dissecação espontânea da artéria coronária, e a intervenção coronária percutânea como modalidade terapêutica ainda é uma questão em debate.

Descritores: Dissecação espontânea da artéria coronária; Infarto do miocárdio; Parada cardíaca; Transtornos relacionados ao uso de substâncias; Angiografia coronária; Doenças vasculares

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INTRODUCTION

Acute myocardial infarction (MI) due to spontaneous coronary artery dissection (SCAD), previously considered as a rare entity associated to pregnancy, is nowadays recognized as a multifactorial disease with increasing prevalence. It is estimated that 0.07% to 0.2% of all MI are related to SCAD.¹ Several investigations suggested some conditions as a subjacent cause for SCAD, namely fibromuscular dysplasia, pregnancy, multiparity, auto-immune diseases and drug abuse.²⁻⁴ Typically, young women without major cardiovascular risk factors are more affected by SCAD, while its documentation in men is rare.⁵

We relate a case of a young male with a multivessel SCAD, presenting with cardiac arrest.

CASE REPORT

A 28-year-old male with previous history of daily tobacco and drug abuse (cannabinoids, 3,4-methylenedioxy-methamphetamine, and cocaine) and recurrent ton-

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sillitis went to the emergency room for intermittent episodes of retrosternal pain with 1 week of evolution. Two weeks before, he was prescribed penicillin for tonsillitis. Eletrocardiogram (ECG) showed a sinus rhythm, mild ST-depression at the inferior leads, and concave elevation of ST-segment at the lateral leads and from V4-V5 (Figure 1). He had a mild troponin I elevation cTn I (0.9ng/mL; normal <0.045ng/mL), and was admitted for presumptive diagnosis of myopericarditis. Transthoracic echocardiogram showed a mild to moderate depression of left ventricular function (40%), with marked hypokinesia of the posterior wall, mid and distal segment of the lateral wall and of the anterior wall, and Doppler findings documented a moderate mitral regurgitation. Few hours later he developed a R-on-T phenomenon complicated with ventricular fibrillation, reverted with one cycle of advanced life support. Post-resuscitation ECG revealed a ST-segment elevation from V1-V4 (Figure 2). Patient underwent immediate coronary angiography, which demonstrated normal and co-dominant right coronary artery, left anterior descending (LAD) artery with a progressive reduction of the diameter (along the proximal and mid segment), and a subocclusion of the distal part, a diagonal branch presenting a diffuse stenosis from the ostium with normal distal caliber, suggesting intramural hematoma/extensive spontaneous coronary dissection (SCAD) and left circumflex artery (LCx) apparently normal but with the first marginal branch had a diffuse stenosis from the ostium suggesting SCAD/hematoma (Figures 3A to 3C). Intracoronary nitrates were administrated without improvement of the lesions. Intravascular coronary imaging was thought but it was not used

due to the patient clinical instability. Patient underwent LAD percutaneous coronary intervention (PCI). A BMW (Abbott) wire was crossed through the true lumen of the LAD, but sudden flow reduction from the ostium (probably due to false lumen extension) was observed (Figure 4A). Patient had increased chest pain and became hemodynamic unstable. Therefore, a drug eluting stent (3.5mm x18mm, Resolute Onyx, Medtronic Vascular) was implanted in the proximal LAD to seal the proximal part of the dissection (Figure 4B). After stent deployment, the distal part of the LAD was with Thrombolysis in Myocardial Infarction (TIMI) 1 flow. Then, a second drug eluting stent (3.0mmx38mm, Resolute Onyx, Medtronic Vascular) was implanted juxtaposed to the previous one (Figure 4C), with acceptable angiographic result, considering that the diagonal branch still had TIMI 2 flow, and important residual stenosis. Left circumflex artery showed *de novo* stenosis in the distal segment, probably due to extension of dissection (Figure 4D). Since patient was asymptomatic, the intervention was concluded. After 1 week, a new coronary angiography was performed, showing LAD had good result, and diagonal branch had slight improvement of distal flow, and distal LCx and first marginal branch had good recovery of distal diameter. Extra-coronary artheriopathies were excluded by computed tomography angiography (CTA), and most relevant autoimmune disease were also ruled out. The most probable etiology of SCAD was the drug abuse hours before the admission. Patient was discharged under dual antiplatelet-therapy, beta-blocker and an angiotensin converter enzyme inhibitor, and is currently under 2 years of follow-up, without recurrence.

Figure 1. Electrocardiogram showing sinus rhythm, ST depression at the inferior leads, and concave elevation of ST segment at the lateral leads and from V4-V5.

Figure 2. Post-defibrillation electrocardiogram showing an elevation of the ST segment from V1-V6.

Figure 3. Coronary angiography showing a multivessel coronary artery dissection (left anterior descending artery, diagonal branch, and first marginal branch).

Figure 4. Percutaneous coronary intervention (A, B e C) Left anterior descending coronary artery percutaneous intervention. (D) Intervention result and left circumflex coronary artery dissection at the distal segment and first marginal branch.

DISCUSSION

Patients with SCAD usually present with an ACS and delayed diagnosis is not rare.¹ Chest pain is the most common symptom (95.9%) and cardiac arrest or ventricular fibrillation are seen much less frequently – 3% to 11% of the reported series.² Also, SCAD is usually diagnosed in young women and is the most common cause of pregnancy-associated ACS. Spontaneous coronary dissection diagnosis in men is rare. In this case, it seemed that the trigger for SCAD was cocaine abuse. The mechanism of cocaine toxicity on the heart and vasculature is predominantly related to its adrenergic properties, with increased blood pressure due to inotropic and chronotropic effects, as well as its vasoconstrictive effect leading to an increase of the shear forces on the coronary endothelium. This combined effect may be responsible for dissection of coronary artery.^{2-4,6} Other hypothesis related to drug abuse is vasospasm, which seemed less probable in this case since the lesions did not improve after intracoronary administration of nitrates, and the angiographic evolution of the multivessel disease was very suggestive of SCAD. Intracoronary imaging was not performed due to patient clinical instability and the risk of further clinical deterioration. Multivessel SCAD is common and careful assessment is required during angiography.¹ Treatment of SCAD is still a matter of debate, but it is generally accepted that conservative management should be considered for hemodynamically stable/asymptomatic patients, who have no involvement of left main coronary artery.^{1,5,7,8} Most cases see complete recovery within a month. Furthermore, there are specific challenges and risks associated with revascularization in SCAD. In the case of our patient, since he was unstable, it was decided to perform PCI. Optimal medical treatment in SCAD is also a matter of discussion. Some experts recommend dual-antiplatelet therapy (DAPT) for, at least, one year after SCAD, regardless of initial management strategy, along with life-long aspirin use.^{1,5} Others opt for no, or limited use (1 to 3 months), of DAPT followed by longer-term aspirin therapy. Beta-blockers are routinely administered, at long term, to reduce arterial shear stress, especially because some studies showed lower risk of recurrent SCAD with its use.^{1,2} Statins are not routinely recommended.

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None.

CONFLICTS OF INTEREST

The authors declare there are no conflicts of interest.

CONTRIBUTION OF AUTHORS

Conception and design of the study: CCO, SR, CGB, JC and JM; data collection: CCO and CGB; data interpretation: CCO, SR, CGB, JC and JM; text writing: CCO; approval of the final version to be published: CCO.

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