

Case Report

Dynamic Systolic Compression of the Left Anterior Descending Coronary Artery as the First Clue of Postinfarction Left Ventricular Pseudoaneurysm

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ABSTRACT

Left ventricular pseudoaneurysm and left ventricular free wall rupture are rare but life-threatening complications of acute myocardial infarction. Dynamic systolic compression of the coronary arteries is almost always due to myocardial bridging. However, it has rarely been described in patients with ventricular aneurysms and pseudoaneurysms. We present a case of a patient with recent myocardial infarction who presented with recurrence of chest pain and coronary angiogram showing patent vessels however with systolic compression of the distal left anterior descending coronary artery as a first clue to postinfarct left ventricular pseudoaneurysm.

RÉSUMÉ

Le pseudoanévrisme du ventricule gauche (PVG) et la rupture de la paroi libre du ventricule gauche sont rares, mais les complications de l'infarctus aigu du myocarde mettent en danger la vie du malade. La compression systolique dynamique des artères coronaires est presque toujours due aux ponts myocardiques. Toutefois, elle a rarement été décrite chez les patients ayant des anévrismes ventriculaires et des pseudoanévrismes. Nous présentons le cas d'un patient qui, après avoir récemment subi un infarctus du myocarde, a eu une récurrence de la douleur thoracique. Il a passé une angiographie coronarienne qui montrait des vaisseaux non obstrués, mais une compression systolique de l'artère interventriculaire antérieure distale comme premier signe de PVG post-infarctus.

Left ventricular pseudoaneurysm (LVP) is a rare but serious complication of acute myocardial infarction (MI) and associated with extremely poor outcome, with high mortality if left untreated. Diagnosis is made with imaging studies and requires a high index of suspicion. We present a rare case of LVP, suspected from left anterior descending (LAD) systolic compression on coronary angiogram.

Case Presentation

A 67-year-old man with a past medical history of hypertension, dyslipidemia, and tobacco abuse presented with excruciating chest pain of few hours duration. His electrocardiogram (ECG) showed ST elevation in the precordial leads, and the catheterization laboratory was activated for emergent coronary angiogram. His vital signs were stable and had no signs of congestive heart failure. Medications included aspirin, clopidogrel, warfarin, metoprolol, lisinopril, and

atorvastatin. Cardiac troponins were normal. ECG showed 2-mm ST-segment elevation and Q waves in the anterior leads (Fig. 1).

The patient reported that 6 weeks before this admission, he had been treated in another hospital with anterior ST elevation MI and received a drug eluting stent in the LAD. He was started on warfarin because of LV thrombus. The previous hospital stay was also complicated by upper gastrointestinal bleeding, and he underwent gastroduodenal artery coiling. Medical records from the previous hospitalization were not available. With this current presentation of acute chest pain and ST elevation on the ECG, emergent coronary angiography was performed to exclude stent thrombosis. The angiogram showed a patent LAD coronary artery stent, along with dynamic systolic compression of the mid-to-distal segments of the LAD coronary artery (Video 1 , view video online). External compression of the vessel by LV aneurysm/LVP was suspected. With the history of LV thrombus and suspicion of pending myocardial rupture, no LV angiogram was performed and urgent echocardiography was felt to be a safer method to reach the diagnosis. Transthoracic echocardiography confirmed the presence of an LV apical pseudoaneurysm (Fig. 2 and Video 2 , view video online). The patient was transferred emergently to the operating room and had successful repair of the LV apical pseudoaneurysm. At 1

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See page 1419.e10 for disclosure information.

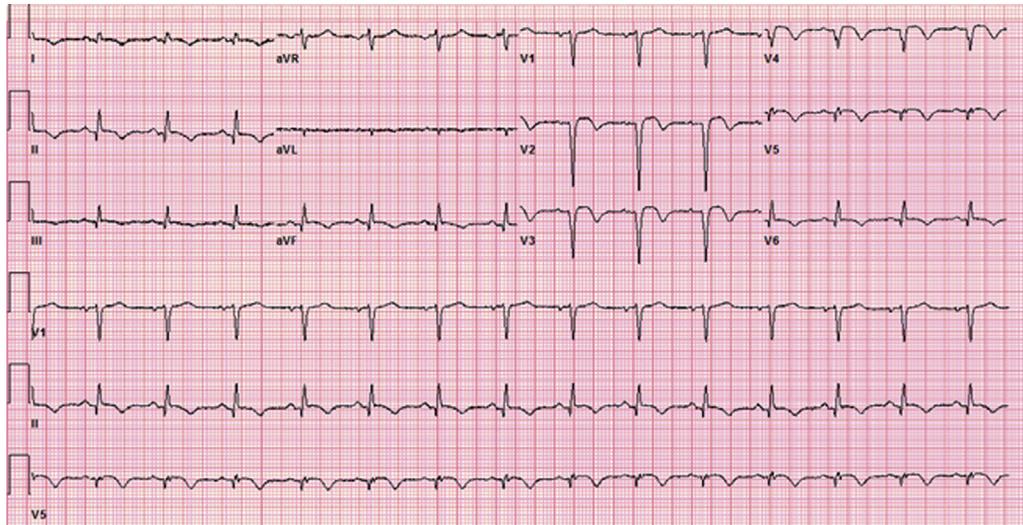


Figure 1. Electrocardiogram shows ST-segment elevation and deep Q wave in the anterior leads and T wave inversion in the lateral and inferior leads.

month after surgery follow-up, the patient was asymptomatic with no signs of heart failure.

Discussion

In our patient, the working diagnosis was acute ST elevation MI from stent thrombosis in a patient with acute onset chest pain and stent placement 6 weeks ago. The findings of patent stent and systolic compression of the distal LAD lead to suspicion of an LV aneurysm or pseudoaneurysm. The latter was more likely as postinfarction aneurysm does not typically present with acute onset chest pain.

LVP is a rare but serious complication of acute MI.¹ It occurs when cardiac rupture is contained by adherent pericardium or scar tissue, with no surrounding endocardial or myocardial tissue.¹ The most frequent symptoms associated

with LVP are chest pain, dyspnea, or arrhythmia.¹ If left untreated, it carries a very high risk of rupture with grave prognosis. Therefore, an early diagnosis and treatment are crucial.

Echocardiography is a reasonable first step.¹ It can usually distinguish a pseudoaneurysm from a true aneurysm by the appearance of the connection between the aneurysm and ventricular cavity. Typically pseudoaneurysms have a narrow neck (less than 40% of the maximal aneurysm diameter).² In contrast, true aneurysms have a wide neck.² Cardiac computerized tomographic angiography and magnetic resonance imaging can also confirm the diagnosis and have become preferred over traditional LV angiogram, as they are noninvasive and can confirm the diagnosis in patients where echocardiography is not diagnostic.³

Although systolic compression of the coronary artery is usually the result of a myocardial bridge, it has been rarely reported in patients with LV aneurysm and LVP.⁴ The systolic expansion of the aneurysmal sac can compress the adjacent coronary artery during systole. Myocardial bridges are usually localized in the middle segment of the LAD;⁵ however, in this case, the systolic compression was more prominent at the distal part of the LAD. This was not a typical location for myocardial bridging, and in this clinical scenario, an external compression from a post-MI aneurysm/pseudoaneurysm was felt more likely.

Conclusions

Myocardial systolic compression in the infarct-related artery may be a sign of a mechanical complication and pseudoaneurysm formation. High index of suspicion is the key for an early diagnosis of this lethal complication and could be lifesaving.

Disclosures

The authors have no conflicts of interest to disclose.

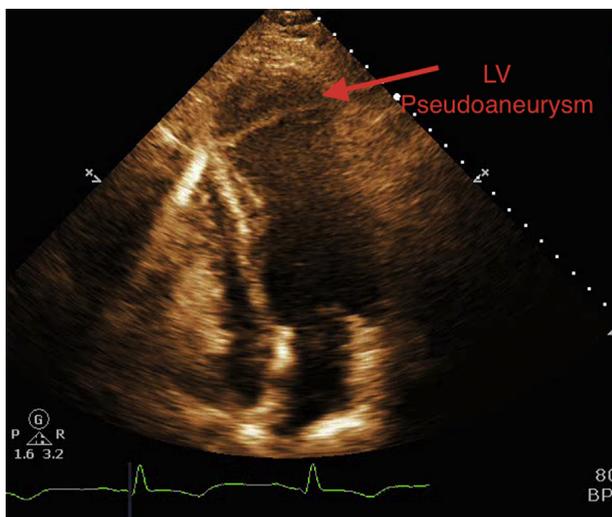


Figure 2. Echocardiogram; apical 4-chamber view reveals a large left ventricular (LV) apical pseudoaneurysm.

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Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Cardiology* at www.onlinecjc.ca and at <https://doi.org/10.1016/j.cjca.2019.06.010>.