A leaking spontaneous coronary artery pseudoaneurysm

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ABSTRACT

A 78-year-old man presented with chest pain and ST segment elevation. Coronary angiography showed no significant coronary artery disease. A saccular pocket of contrast material was found outside of the distal right posterior descending coronary artery consistent with a pseudoaneurysm. Echocardiography showed a pocket of pericardial fluid behind the left atrium concerning for a hemopericardium. The pseudoaneurysm was treated urgently with two coils successfully deployed to obtain complete exclusion of the pseudoaneurysm sac and occlusion of the distal portion of the posterior descending coronary artery.

KEYWORDS Coil embolization; coronary angiography; coronary artery pseudoaneurysm; hemopericardium; ST segment elevation

Spontaneous coronary artery pseudoaneurysm is very rare.¹ We describe a case presenting with chest pain, ST segment elevation, and hemopericardium due to a leaking spontaneous coronary artery pseudoaneurysm.

CASE DESCRIPTION

A 78-year-old man with stage 3 chronic kidney disease, type 2 diabetes mellitus, and hypertension presented to the emergency department after 3 days of constant left-sided chest pain radiating to the left arm. The electrocardiogram showed ST segment elevation in leads I, II, aVF, and V3–6, which was new compared to an electrocardiogram from a year earlier (*Figure 1*). The troponin was 0.066 ng/mL (upper limit of normal 0.034 ng/mL). Coronary angiography showed no significant coronary artery disease. A saccular pocket of contrast material was found outside of the distal right posterior descending coronary artery (*Figure 2a*, *Figure 2b*). A coronary angiogram 6 years earlier did not show the aneurysm (*Figure 2c*). Transthoracic echocardiography (TTE) parasternal long-axis view showed a small pocket of pericardial fluid of mild echogenicity behind the lower portion of the left atrium (*Figure 3a*), which was not observed on a TTE from 4 years earlier (*Figure 3b*). A 2 mm × 4 cm coil was successfully placed beyond and across the pseudoaneurysm. A second 2 mm × 4 cm coil was deployed to obtain complete exclusion of the pseudoaneurysm sac and occlusion of the distal portion of the posterior descending coronary artery (*Figure 4*).

DISCUSSION

Coronary artery pseudoaneurysm is defined as an outward bulging that lacks at least one of the three layers of the arterial wall.¹ Our case is more likely a pseudoaneurysm due to its narrow neck, unusual shape, and independent motion, along with new electrocardiographic and echocardiographic changes. Most coronary artery pseudoaneurysms are due to arterial dissection or perforation induced by percutaneous coronary intervention, trauma, infection, pregnancy, or, occasionally, cardiac tumors.^{2–4} Spontaneous coronary artery pseudoaneurysm is rare, with a poorly defined incidence, natural history, and outcomes.

Figure 1. (a) Electrocardiogram upon presentation showing ST segment elevation in multiple leads (arrows). (b) Electrocardiogram 1 year earlier showing normal ST segment.

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Received April 6, 2020; Revised April 14, 2020; Accepted April 20, 2020.

In addition to invasive coronary angiography, various imaging modalities have been utilized to evaluate coronary artery pseudoaneurysms, including echocardiography, multidetector computed tomography, magnetic resonance imaging, and intravascular ultrasound. These imaging tools further assess the size and location of the pseudoaneurysms, the surrounding structures, and potential complications. Our case illustrates that in patients with spontaneous coronary artery pseudoaneurysms, subtle findings of a small amount of pericardial fluid on TTE may portend a serious complication of the pseudoaneurysm. In our case, these findings were particularly helpful in determining the urgency of pseudoaneurysm management.

Figure 2. (a) Coronary angiography showing right coronary artery (RCA) without significant stenosis. (b) Delayed imaging showing a pseudoaneurysm (arrows) in the distal right posterior descending artery (PDA). (c) Coronary angiography 6 years earlier showing no pseudoaneurysm.

Figure 3. (a) Transthoracic echocardiography parasternal long-axis view showing a pocket of pericardial fluid (arrows) behind the lower portion of the left atrium (LA). (b) Transthoracic echocardiography 4 years earlier was normal. LV indicates left ventricle.

Figure 4. Coil embolization of the coronary artery pseudoaneurysm. (a) A microcatheter was advanced to the distal posterior descending artery (PDA) just past the pseudoaneurysm (arrows). (b) Two 2 mm × 4 cm coils were successfully deployed. (c) Final angiogram showing complete exclusion of the pseudoaneurysm sac and occlusion of the distal PDA (arrow).

Because spontaneous coronary artery pseudoaneurysm is rare, no standard treatment has been established and management should be decided on a case-by-case basis. Treatment options include percutaneous intervention with a covered stent, coil embolization, coronary artery bypass graft with isolation of the pseudoaneurysm, or conservative management with vigilant clinical follow-up.^{5,6} Symptomatic patients, particularly those with signs of leaking or microperforation, will benefit from more urgent intervention to prevent pseudoaneurysm expansion, rupture, and mortality. We chose coil embolization because the lesion was too distal and the vessel was too small for a covered stent. Our case adds to the literature showing that coil embolization is a safe and feasible option in selected patients.

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1. Kar S, Webel RR. Diagnosis and treatment of spontaneous coronary artery pseudoaneurysm: rare anomaly with potentially significant clinical implications. *Catheter Cardiovasc Interv.* 2017;90:589–597. doi:10.1002/ccd.26997.
2. Pontone G, Cavallotti L, Bertella E, et al. An unusual presentation of giant right coronary artery pseudoaneurysm as a late complication of stent rupture treated by hybrid procedure: unusual presentation of stent rupture. *JACC Cardiovasc Interv.* 2014;7:e145–e146. doi:10.1016/j.jcin.2014.03.012.
3. Yoshioka D, Izutani H, Ryugo M, Kawachi K, Sawa Y. Asymptomatic giant traumatic right coronary artery pseudoaneurysm caused by sternal fracture. *Ann Thorac Surg.* 2011;92:e33–e35. doi:10.1016/j.athoracsur.2011.03.046.
4. Chaturvedi A, Vummidi D, Shuman WP, Dubinsky TJ, Maki JH. Cardiac angiosarcoma: an unusual cause of coronary artery pseudoaneurysm. *J Thorac Imaging.* 2012;27:W8–W9. doi:10.1097/RTI.0b013e3182078187.
5. Dalal P, Varma D, Chakravorty R, et al. Transcatheter embolization of a giant coronary artery pseudoaneurysm. *Cardiovasc Revasc Med.* 2018;19:204–208. doi:10.1016/j.carrev.2017.10.0.
6. Kaneko U, Kashima Y, Kanno D, Fujita T. Giant coronary artery pseudoaneurysm formed after septal artery perforation during retrograde percutaneous coronary intervention: a conservative strategy with serial cardiac computed tomographic imaging. *JACC Cardiovasc Interv.* 2018;11:e23–e24. doi:10.1016/j.jcin.2017.08.049.