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Letter to the Editor · Open Access ·

Left ventricular pseudoaneurysm

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A 72-year-old elderly male smoker with a known history of hypertension presented with a six day history of chest pain. His blood pressure at presentation was 110/70 mmHg and there was no audible murmur. ECG showed Q waves in the inferior leads (Figure 1A) and troponin level was elevated (14 μg/L). Chest X-ray showed cardiomegaly with linear atelectasis in both lung bases.

The working diagnosis was a delayed presentation of inferior myocardial infarction (MI) and was treated with antithrombotic therapy. He was scheduled to undergo an urgent coronary angiography the next day. Prior to radial artery puncture, he developed a generalized tonic clonic seizure in the cardiac catheterization laboratory and was noted to have profound bradycardia. Active cardio-pulmonary resuscitation was immediately performed. He responded to active resuscitative measures but developed cardiogenic shock requiring high dose inotropic support (intravenous dopamine and noradrenaline). Repeat ECG showed ST elevation in the inferior leads (Figure 1B).

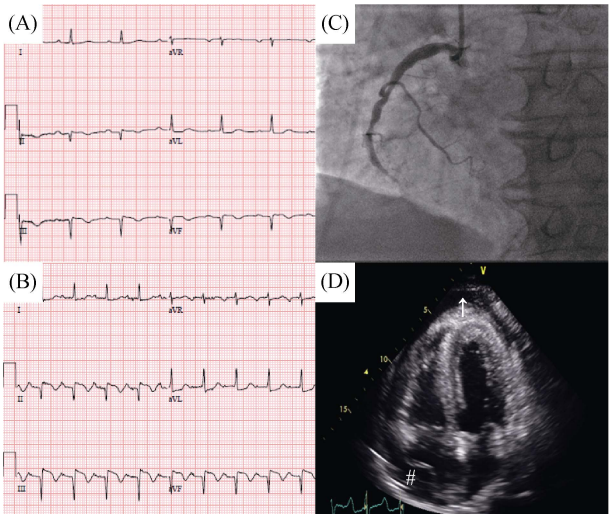

Figure 1. ECG results. (A): ECG (at presentation) showing q waves in inferior leads; (B): ECG (after hemodynamic collapse) showing ST elevation in inferior leads; (C): coronary angiography of right coronary artery showing distal occlusion; and (D) apical 4 chamber view of echocardiogram showing presence of pericardial effusion, right atrial collapse (denoted by #) and solid layer of material on surface of the heart (denoted by ↑).

Coronary angiography showed single vessel disease with an occluded distal right coronary artery (Figure 1C). His left coronary system showed minor coronary artery disease. Emergency percutaneous coronary intervention was immediately performed but distal flow could not be restored. An intra-aortic balloon pump was subsequently inserted for hemodynamics support. Echocardiogram showed left ventricular (LV) ejection fraction of 35% with akinesia in the inferior-posterior region. There was a moderate amount of pericardial effusion with right atrial collapse. There was also a solid layer of material on the surface of the heart which was suggestive of blood clot (Figure 1D).

A decision was made to perform a left ventriculogram (LVgram) which revealed a LV pseudoaneurysm (Figure 2). Based on the clinical profile, echocardiographic and LVgram findings, he was diagnosed to have a contained LV rupture secondary to delayed presentation of inferior MI, and transferred to the cardiothoracic unit for emergency surgical repair and drainage of pericardial effusion. Operative findings revealed the site of rupture at the posterolateral region of LV. His condition stabilized post-operatively and was successfully discharged from coronary care unit after two weeks.

The incidence of LV pseudoaneurysms is relatively low and most cases of LV pseudoaneurysm are related to acute myocardial infarction (AMI, particularly inferior wall MI) and cardiac surgery.[1,2] LV pseudoaneurysms form when cardiac rupture is contained by adherent pericardium or scar tissue. They typically have a neck narrower than the diame-

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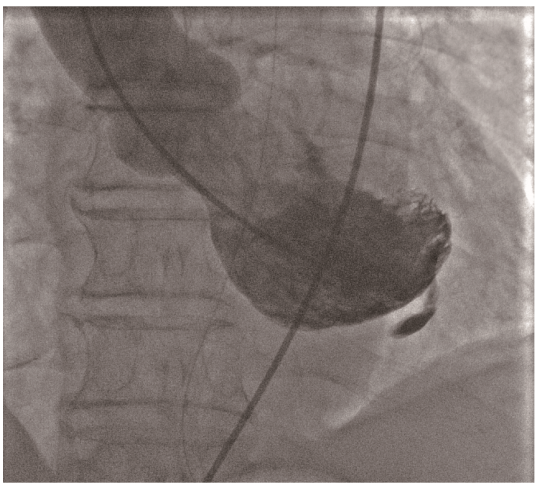

Figure 2. Left ventriculogram (left anterior oblique projection) showing presence of left ventricular pseudoaneurysm.

ter of the aneurysm and are more often located in the posterior and lateral wall segments.[3] Investigations that can be undertaken to detect LV aneurysms/pseudoaneurysm include transthoracic/transesophageal echocardiography, LVgram, CT and cardiac magnetic resonance imaging.

LV pseudoaneuryms are prone to rupture (estimated risk 30%–45% based on prior studies) akin to a "ticking time-bomb" and thus, a surgical approach is often undertaken.[4–6] A previous study evaluated the clinical presentation, diagnostic accuracy of imaging modalities, outcomes and prognosis of 290 patients with LV pseudoaneurysms.[1] Congestive heart failure, chest pain and dyspnea were the most frequently reported symptoms but > 10% of patients were asymptomatic. Physical examination revealed a murmur in 70% of patients.

The majority of patients have ECG abnormalities (usually nonspecific ST segment changes) and only 20% of patients had ST segment elevation. More than 50% of patients may demonstrate the appearance of a mass on chest X-ray which provided an important clue to the diagnosis. LVgram was the most definitive test. Regardless of treatment, patients with LV pseudoaneurysms had a high mortality rate especially those who did not undergo surgery. LVgram is considered as a part of cardiac catheterization but its use varies by geographic regions, institutions and individuals.[7] Currently, there are no specific guidelines on the performance of LVgram at the time of coronary angiography and the decision is left to the discretion of the operator. Critics of LVgram often argue that it adds to the cost, risk, higher volume of contrast and radiation exposure and it may be replaced by noninvasive imaging.

When performed appropriately, LVgram provides useful information like: (1) ejection fraction of left ventricle; (2) wall motion and ventricular thrombus; (3) ventricular volume; (4) regurgitant lesions; and (5) aneurysm, pseudoaneurysm and ventricular septal defects.

A recent paper made several recommendations on the use of LVgram during coronary angiography based on the consensus of the writing group.[7] Among the recommendations, they suggested performing LVgram when LV function or wall motion is unknown or mechanical disruption is suspected and results of the study will help determine therapy. They also suggested performing LVgram selectively and avoid it when it creates significant risk. For our index patient, he presented with delayed inferior MI and was stable at presentation.

His sudden change in hemodynamic status prompted several cardiac investigations which did not reveal the apparent cause of his sudden deterioration. A decision was made to perform an LVgram as his state of cardiogenic shock was out of proportion to the lone occluded right coronary artery.

Our case highlights two major learning points: (1) one should be vigilant to look out for mechanical complications in patients presenting with delayed MI especially when there is a sudden change in the hemodynamic status.[8] ECG is useful to rule out mechanical complications like ventricular septal rupture, papillary muscle rupture leading to severe mitral regurgitation, pericardial effusion/cardiac tamponade, free wall rupture, etc. (2) Among all the mechanical complications of AMI, LV pseudoaneurysm is probably the hardest to diagnose ("hidden time-bomb"). A high index of clinical suspicion is needed to avoid missing the diagnosis. As illustrated by our index case, LVgram was the definitive test to clinch the correct diagnosis and thus guided our therapy. One should use it judiciously in critically ill AMI patients when the cause of cardiogenic shock is unclear.

References

1 Frances C, Romero A, Grady D. Left ventricular pseudoaneurysm. *J Am Coll Cardiol* 1998; 32: 557–561.

2 Tuan J, Kaivani F, Fewins H. Left ventricular pseudoaneurysm. *Eur J Echocardiogr* 2008: 107–109.

3 Brown SL, Gropler RJ, Harris KM. Distinguishing left ventricular aneurysm from pseudoaneurysm: a review of the literature. *Chest* 1997; 111: 1403–1409.

4 Van Tassel RA, Edwards JE. Rupture of heart complicating myocardial infarction: analysis of 40 cases including nine examples of left ventricular false aneurysm. *Chest* 1972; 61: 104–116.

5 Yeo TC, Malouf JF, Oh JK, Seward JB. Clinical profile and

outcome in 52 patients with cardiac pseudoaneurysm. *Ann Intern Med* 1998; 128: 299–305.

6 Ivert T, Almdahl SM, Lunde P, Lindblom D. Postinfarction left ventricular pseudoaneurysm-echocardiographic diagnosis and surgical repair. *Cardiovasc Surg* 1994; 2: 463–466.

7 Gigliotti OS, Babb JD, Dieter RS, *et al*. Optimal use of left ventriculography at the time of cardiac catheterization: A consensus statement from the society for cardiovascular angiography and interventions. *Catheter Cardiovasc Interv* 2015; 85: 181–191.

8 Kutty RS, Jones N, Moorjani N. Mechanical complications of acute myocardial infarction. *Cardiol Clin* 2013; 31: 519–531.