Contained rupture of left ventricular false aneurysm after acute myocardial infarction secondary to left anterior descending artery embolism

Daniel Dubreuil MD¹, Gilbert Gosselin MD², Yves Hébert MD¹, Louis P Perrault MD PhD¹

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Left ventricular free wall rupture is a rare complication of acute myocardial infarction and accounts for a significant number of fatalities. Pseudoaneurysm is a variety of left ventricular rupture whereby the pericardium seals the defect, forming the wall of the pseudoaneurysm. The diagnosis is usually confirmed with echocardiography, and emergent surgical repair is required in suspected impending rupture. The present report describes the case of a 58-year-old woman who presented with a myocardial infarction due to distal left anterior descending artery occlusion, complicated by ventricular pseudoaneurysm with impending rupture. The patient had an otherwise normal coronary tree.

Key words: Aneurysm; Coronary disease; Myocardial infarction

Pseudoaneurysm of the left ventricle is a rare complication of myocardial infarction (MI), and has a propensity to rupture and cause sudden death. Early diagnosis and surgical exploration is crucial in the management of this pathology. We describe a patient with a contained left ventricular false aneurysm rupture following an acute MI secondary to left anterior descending (LAD) artery embolism.

CASE PRESENTATION

A 58-year-old woman with a history of osteoporosis, hypertension, appendectomy, chronic obstructive pulmonary disease and bipolar disorder presented with complaints of palpitations, intermittent chest tightness, dizziness and shortness of breath of three weeks duration. On physical examination, she had a heart rate of 160 beats/min, a systemic blood pressure of 117/69 mmHg, no fever and an oxygen saturation of 98% on ambient air. The jugular venous pressure was elevated at 10 cm H₂O, lung fields were clear, heart sounds were normal with no rubs and there was slight peripheral edema. A resting electrocardiogram showed atrial flutter. Chest x-ray showed a cardiomegaly and small left pleural effusion. Laboratory data were unremarkable except for a serum troponin level of 0.10 µg/L (normal less than 0.03 µg/L). The patient was admitted overnight with a diagnosis of atrial flutter and a recent myocardial infarct. Medical treatment was initiated with acetylsalicylic acid, heparin, verapamil and digoxin.

The next morning, two-dimensional echocardiography revealed a small hyperdynamic left ventricle and a contained rupture at the apex

La rupture contenue d'un faux anévrisme ventriculaire gauche après un infarctus aigu du myocarde secondaire à une embolie de l'artère interventriculaire antérieure

La rupture de la paroi libre du ventricule gauche est une complication rare de l'infarctus aigu du myocarde et entraîne un nombre important de décès. Le pseudoanévrisme est une variété de rupture ventriculaire gauche par lequel le péricarde scelle l'anomalie et forme la paroi du pseudoanévrisme. D'ordinaire, le diagnostic est confirmé par échographie, et une réparation chirurgicale émergente s'impose en cas de crainte de rupture imminente. Le présent rapport décrit le cas d'une femme de 58 ans qui a consulté à cause d'un infarctus du myocarde imputable à une occlusion de l'artère interventriculaire antérieure distale compliquée par un pseudoanévrisme ventriculaire menaçant de se rompre. Autrement, la patiente avait un arbre coronaire normal.

Figure 1) Two-dimensional echocardiography. LV Left ventricle; PA Pseudoaneurysm

with a circumferential pericardial effusion of 2.5 cm (Figure 1). The effusion contained fibrinous deposits without signs of tamponade. The patient underwent immediate cardiac catheterization. Left ventricular

¹Department of Surgery; ²Department of Cardiology, Montreal Heart Institute and Université de Montréal, Montreal, Quebec

Correspondence: Dr Louis P Perrault, Department of Surgery, Montreal Heart Institute, 5000 Belanger Street, Montreal, Quebec H1T 1C8.

Telephone 514-376-3330 ext 3471, fax 514-376-1355, e-mail louis.perrault@icm-mhi.org

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Figure 2) Left ventricular apical pseudoaneurysm

function was normal. A coronary angiography revealed a distal obstruction of the LAD artery with otherwise normal coronary vessels.

The patient underwent emergent surgery for aneurysmectomy with a working diagnosis of impending rupture of a left ventricular pseudoaneurysm. Intraoperative transesophageal ultrasound showed a pseudoaneurysm of the apex, pericardial effusion, moderate tricuspid regurgitation and an ostium secundum atrial septal defect 1.2 cm in diameter. Cardiopulmonary bypass was initiated through arterial and venous femoral cannulation before sternotomy, and the pericardium was opened, revealing abundant blood-tinged pericardial fluid and fresh, thick adhesions. After cardioplegic arrest and left ventricular venting through the right superior pulmonary vein, the pseudoaneurysm of the apex was opened and the chamber's diameter was estimated to be 6 cm (Figure 2). Necrotic tissue was excised and the defect was closed with a bovine pericardial patch sutured with a double running stitch of 3-0 Prolene (Ethicon Inc, USA). Right auriculotomy was performed thereafter and the atrial septal defect (ASD) was repaired by primary closure with 4-0 Prolene. The aortic clamping time was 43 min and cardiopulmonary bypass was weaned easily with noradrenaline after a 90 min run with intraoperative blood losses of 600 mL. Intraoperative transesophageal echocardiography showed normal biventricular function with no residual ASD or ventricular aneurysm.

The postoperative course was uneventful except for a left pleural effusion, which required drainage. The patient was discharged on postoperative day 7. Transthoracic echocardiography was done before discharge and showed apical akinesia, a left ventricular ejection fraction of 60% and normal ventricular geometry with no residual shunt.

DISCUSSION

Left ventricular free wall rupture is a rare complication of acute MI and accounts for 15% to 30% of fatalities (1). Pseudoaneurysm is a variety of left ventricular rupture whereby the pericardium seals the defect, making the wall of the pseudoaneurysm. Less frequently, a left ventricular aneurysm may be due to infectious agents such as salmonella (2). Presentation can be dramatic with tamponade and shock, or it can be subacute with arrhythmia, prolonged or recurrent chest pain, and heart failure (1). The diagnosis is usually confirmed by echocardiography (3) and emergent surgical repair is required in suspected impending rupture. Multiple surgical techniques have been described but all involve extensive debridement into normal muscle, thrombectomy of the ventricle and closure with or without a patch, with preservation of left ventricular geometry.

The present case also illustrates the situation of MI due to distal LAD artery occlusion complicated by ventricular pseudoaneurysm with impending rupture in a patient with an otherwise normal coronary tree. We have previously reported (4) a case of giant left ventricular thrombus in a cocaine user with no coronary disease, in whom MI occurred secondary to spasm. The exact source of the embolus to the LAD artery cannot be confirmed with certainty in the present case but could be due to left auricular thrombus secondary to the flutter (although there was no evidence of this on transesophageal echocardiography examination). The presence of a significant ASD makes the possibility of a paradoxical embolism plausible, as described before in a patient with a right ventricular tumour-related thrombus (5), but no evidence of right-sided or venous system thrombus was uncovered in the present case. These unusual situations should be kept in mind in patients presenting with complicated myocardial infarction with normal coronary arteries.

REFERENCES

1. Birnbaum Y, Chamoun AJ, Anzuini A, Lick SD, Ahmad M, Uretsky BF. Ventricular free wall rupture following acute myocardial infarction. *Coron Artery Dis* 2003;14:463-70.
2. Mathieu P, Marchand R, Tardif JC, Perrault LP. Ventriculotomy and resection for left ventricular thrombus infection with salmonella. *Eur J Cardiothorac Surg* 2000;18:360-2.
3. Raposo L, Andrade MJ, Ferreira J, et al. Subacute left ventricle free wall rupture after myocardial infarction: Awareness of the clinical signs and early use of echocardiography may be life-saving. *Cardiovasc Ultrasound* 2006;4:46.
4. Fortier S, Demaria R, Pelletier GB, Carrier M, Perrault LP. Left ventricular thrombectomy in a cocaine user with normal coronary arteries. *J Thorac Cardiovasc Surg* 2003;125:204-5.
5. Dumont E, Racine N, Ugolini P, Carrier M, Pellerin M, Perrault LP. Paradoxical cerebral emboli of hypernephroma metastatic to the right ventricle five years after primary tumor resection. *J Thorac Cardiovasc Surg* 2002;123:572-3.