Negative results - Cardiac general

Left ventricular pseudoaneurysm after pericardiocentesis

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Abstract

We present the case of a patient with recurrent episodes of pericardial effusion and fever. During approximately one month, the patient was treated with double pericardiocentesis for cardiac tamponade and the last of them was interrupted for the suspect of left ventricular puncture due to aspiration of arterial blood from the needle used for pericardiocentesis. Considering the suspect of infective pleuro-pericarditis and patient’s symptoms, a surgical drainage of the pericardial effusion was performed via right thoracotomy. The echocardiography and CT-scan performed after right thoracotomy showed only a mild pericardial effusion. Fifteen days later, the patient suffered from congestive heart failure and fever. The echocardiography and CT-scanning which were performed urgently, showed a large pseudoaneurysm (approx. 26 mm × 36 mm) of the apex of the left ventricle. Ventriculography confirmed the presence of the pseudoaneurysm in connection with the left ventricular apex. Exclusion of the LV pseudoaneurysm was performed using a Prolene 0 running suture on two strips of bovine pericardium, avoiding ECC use. The patient was discharged on the 7th postoperative day. Iatrogenic pseudoaneurysm caused by pericardiocentesis represents a very rare complication and it should be prevented by identifying the high-risk patients.

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1. Clinical summary

We present the case of a 61-year-old male, without cardiac risk factors, with a history of myelomonocytic leukemia and recent appearance of pericardial effusion, cough and fever. Despite medical therapy with anti-inflammatory drugs and furosemide, the pericardial effusion became more and more important up to cardiac tamponade: then, the patient was treated with pericardiocentesis without complications. In a peripheral hospital approximately one month later, for another episode of cardiac tamponade, the patient underwent a new pericardiocentesis which was interrupted for the suspect of left ventricular puncture due to aspiration of arterial blood from the needle used during the procedure. Ecocardiography showed a thickening of the pericardium. Because of the suspect of infective pleuro-pericarditis, the thoracic surgeon decided to perform a surgical drainage via right thoracotomy. Probably, considering the absence of a cardiac surgery division in the peripheral hospital, this approach was chosen by the thoracic surgeon to obtain full access to the pleural cavity for a complete lung examination and, furthermore, to take a portion of the tissues for histological and bacteriological examination. The procedure was performed without complications. As the thoracic surgeon described, strong pericardial adhesions around the heart were observed. Portions of the pericardium, of the pleura and of the lung were used for histological and bacteriological examinations, which resulted negative. The echocardiography and CT-scan performed showed only a mild pericardial effusion without evidence of the pseudoaneurysm or discontinuation in the left ventricular wall.

Fifteen days later, the patient returned to hospital suffering from congestive heart failure and fever, with dyspnea, cough and orthopnea.

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Fig. 1. (a) Flow from LV to pseudoaneurysm. (b) Left ventriculography.
Echocardiography and CT-scanning showed a large pseudoaneurysm (approx. 26 mm × 36 mm) of the apex of the left ventricle (Fig. 1a) and a mild pericardial effusion. However, preoperative ejection fraction (EF) was preserved (EF 60%). Coronary arteriography showed normal coronary arteries and ventriculography confirmed the presence of the pseudoaneurysm (Fig. 1b). Considering the rapid onset of the lesion and the risk of rupture, we decided for a surgical approach avoiding extracorporeal circulation (ECC) because of the thrombocytopenia (PLTs <20,000), in order to prevent bleeding or thrombo-embolic complications.

A large and well-delimited dyskinetic area of the left ventricle was identified (Fig. 2a): the pseudoaneurysm was abundantly supplied by the flow from the left ventricle but no communication with the pericardial cavity was found and the pericardium was strongly adherent to the epicardium in that area.

The lesion was excluded with a Prolene 0 running suture on two strips of bovine pericardium (Fig. 2b). The postoperative course was uneventful and echocardiography showed no pericardial effusion, normal left ventricle volumes and function (EF 70%).

2. Discussion

A pseudoaneurysm of the ventricle is formed when there is rupture of the myocardial wall with the discontinuity being roofed over by pericardium and mural thrombus or fibrous tissue without myocardial elements.

Frequently, LV pseudoaneurysms occur as a complication of myocardial infarction or after cardiac surgery. However, there are several cases of left ventricular (LV) pseudoaneurysm formation after penetrating injuries [1], as well as after closed thoracic trauma [2] or after infective pericarditis [3]. Otherwise, cases of pseudoaneurysm resulting from iatrogenic etiology are rarer and, among these, the occurrence of iatrogenic LV pseudoaneurysm due to accidental perforation of the myocardium and penetration into the left ventricle during an attempted pericardiocentesis is even rarer [4].

In this case, the myocardium fragility related to chronic myelomonocytic leukemia and recurrent pericardial effusion, may have played a role in pseudoaneurysm formation. Moreover, the pseudoaneurysm would have been caused during the second pericardiocentesis but the strong pericardial adhesions around the apex of the heart probably prevented an abrupt pericardial tamponade and allowed the quick but gradual formation of a pseudoaneurysm.

Some aspects of our case are remarkable: first, at the moment of LV pseudoaneurysm diagnosis, the patient returned to hospital suffering from congestive heart failure but no cardiac tamponade or LV dysfunction was detected; second, the patient was very thin and it could be one of the risk factors; third, strong pericardial adhesions could cause right-side rotation of the heart with an altered position of the cardiac cavity. This may be the reason because the needle could damage the left ventricular wall during pericardiocentesis.

In conclusion, to avoid these complications, high-risk patients must be identified and echocardiographic puncture monitoring using a finer needle must be used.

References