Right atrium traumatic rupture presenting as chronic tamponade

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Abstract

Non-penetrating cardiac traumatisms can cause cardiac rupture, myocardial contusion or, rarely, commotio cordis. In cases of rupture of a cardiac cavity, acute and severe cardiac tamponade almost invariably occurs. This paper presents an exceptionally unusual case of non-penetrating cardiac trauma resulting in right atrium rupture contained by the pericardial cavity. A situation of exceptional hemodynamic balance was established with subacute, progressive cardiac tamponade that evolved during three months, presenting gradual right-heart failure instead of the expected acute and severe cardiac tamponade. The rupture of the atrium was successfully repaired.

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1. Clinical summary

The patient is a 75-year-old woman complaining of atypical chronic lymphatic leukemia stage IA without treatment or complications as the only remarkable antecedent. In June 2008, she was admitted in another institution because of analytical progression of her leukemia to stage IIIC with appearance of mediastinic adenopathies and discrete pleuropericardic effusion in a control CT-scan. Shortly after her admittance, she presented nausea and headache, followed by loss of consciousness and respiratory depression, reason why maneuvers of cardiopulmonary resuscitation were initiated. During the heart massage, she underwent left costal fractures and hemothorax that required drainage. She was discharged home without sequelae, under chemotherapeutic treatment.

Three months later, she was admitted by effort dyspnea, slowly progressing during this lapse from I to III NYHA functional class. A transthoracic echocardiography demonstrated a 20 mm pericardial effusion in the anterior wall. She was referred to our institution. A contrast enhanced thoraco-abdominal CT-scan was performed and the presence of a hyperdense paracardiac image in the anterior mediastinum was shown (Fig. 1) resembling a big pseudoaneurysm partially compressing the right chambers, with no significant images of clots in it. Although free and active pass of contrast to the pericardial cavity was realized, no point of rupture of cardiac chambers could be identified. With the diagnosis of right-heart failure and chronic tamponade, the decision was made for surgical treatment.

After anesthetic induction, transesophageal echocardiography showed a wide right-atrium rupture freely communicating with pericardial cavity, without right atrium collapse (Fig. 2). Femoral cannulation was performed first, and after sternotomy was made the pericardium appeared tense. Cardiopulmonary bypass was then established, resulting in immediate reduction in pericardial tension. Once the pericardial opening was made, venous blood without clots was encountered. A 2×3 cm rupture of the base of the right atrium, next to the atrio-ventricular groove, was revealed. The rupture was closed with two 3/0 PTFE pletgeted mattress sutures. Noticeably, pericardial cavity showed adhesions resembling those of patients with previous pericarditis. These adhesions limited pericardial cavity to right atrium and partially to anterior right ventricular wall. The patient was discharged home on the sixth postoperative day without incidences.

2. Discussion

Cardiac trauma can be penetrating or, as in our case, non-penetrating. Non-penetrating cardiac trauma, with an estimated incidence of 0.1% [1], can cause cardiac rupture, cardiac contusion or, exceptionally, the alteration known as commotio cordis. The cardiac rupture after non-penetrating cardiac trauma can cause free-wall rupture of the heart cavities, the interventricular septum, the atrio-ventricular valvular apparatus, or even the sigmoid valves.

The structure most frequently implicated in cardiac rupture after non-penetrating trauma is the right atrium (40.6%), followed by the right ventricle (31.3%) and, less commonly, the left atrium, the left ventricle and the simultaneous rupture of two cardiac cavities [2].

In most cases, if the pericardial cavity integrity is preserved, there is a severe and acute cardiac tamponade from which only a 0.3–1.1% of patients survive long enough to receive medical assistance [3].

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In our case, there had been a rupture of the right atrium probably due to cardiac compression during cardiopulmonary resuscitation maneuvers in a patient with previous pericardial effusion and adhesions. These adhesions, as confirmed by operative findings, limited pericardial cavity to the right atrium and to a small portion of the free right ventricular wall, precluding the pericardial blood to compress left cavities and, importantly, the mean part of right ventricle and inferior vena cava. We hypothesize that this fact is the first key to explain the physiopathology of the case. The second key could be the pericardial cavity acting as the patient’s right atrium itself, due to the broad communication with right atrial cavity probably without significant pressure gradient between them. These two facts could explain the absence of immediate collapse and the slow appearance of right-heart failure. This is an extremely unusual situation, since in these cases cardiac tamponade usually appears just after the break and needs immediate surgery [4]. In our case, the patient survived three months with the rupture, receiving surgical correction on a deferred time.

References