SPONTANEOUS CARDIAC TAMPONADE RELATED TO A CORONARY INJURY BY A PERICARDIAL CALIFICATION: A CASE REPORT

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Abstract:

Background

Cardiac tamponade is a rare but severe complication of pericardial effusion with a poor prognosis. Prompt diagnosis using transthoracic echocardiography allows guiding initial therapeutic management. Although etiologies are numerous, cardiac tamponade is more often due to a hemopericardium. Lethal cardiac tamponade is frequently related to a rupture of an acute myocardial infarction or to an intra-pericardial rupture of dissecting ascending aortic aneurysm. Rarely, a coronary injury may result in a hemopericardium with cardiac tamponade. Coronary artery aneurysm due to atherosclerosis, chest trauma or localized infections are the main etiologies but blunt, open chest trauma or complication of endovascular procedures have also been described.

Case presentation

A 83 year-old hypertensive man presented for dizziness and hypotension. The patient had oliguria and mottled skin. A severe metabolic acidosis was observed. Transthoracic echocardiography disclosed a circumferential pericardial effusion with a compressed right atrium. Contrast-enhanced thoracic CT scan confirmed the presence of the circumferential pericardial effusion. A pig-tail catheter placed within the pericardial sac allowed to withdraw 500 mL of blood, resulting in a transient improvement of hemodynamics. Rapidly, recurrent hypotension prompted a reoperation under extracorporeal circulation. An active bleeding was identified at the level of the retroventricular coronary artery. The pericardium was thickened with several “sharping” calcified plaques in the vicinity of the bleeding areas. The postoperative course was uneventful. On day 2, vasopressors were stopped and the patient was successfully extubated. Final diagnosis was a spontaneous cardiac tamponade secondary to a coronary artery injury attributed to a “sharping”calcified pericardial plaque.
Conclusion

Cardiac tamponade secondary to the development of a hemopericardium may develop as the result of a myocardial and coronary artery injury induced by a calcified pericardial plaque.

Key Words:
Hémopéricardium, tamponade, chronic péricarditis, coronary artery
Background

Cardiac tamponade is a life-threatening complication of pericardial effusions. Prompt diagnosis using transthoracic echocardiography allows guiding initial therapeutic management [1,2]. Although etiologies are numerous, cardiac tamponade is most frequently related to acute conditions involving the ascending aorta or to myocardial diseases [3]. We herein report on a patient presenting with cardiac tamponade secondary to a myocardial and coronary artery injury related to an erosive pericardial calcification, who had a favourable outcome after surgical decompression.

Case presentation

A 83 year-old hypertensive man presented to the Emergency Department for dizziness and hypotension. Usual treatment included β-blockers, diuretics, ACE inhibitors and platelet inhibitors for hypertension and arrhythmia. The patient denied any thoracic pain or recent trauma. Upon admission, blood pressure was 60/40 mmHg on both arms, and hypotension persisted despite a fluid loading of 2.5 L. A vasopressor support was promptly initiated (norepinephrin: 1.2 µg/kg/min). A bradycardia (54 bpm) with decreased cardiac sounds and distended jugular veins were noted. The patient had oliguria and mottled skin. A severe metabolic acidosis was observed (pH: 7.31; BD: -10.4 mmol/L; lactate: 6.76 mmol/L). ALAT level was moderately increased (62 UI/L), while bilirubin and troponin levels were normal. The electrocardiogram recorded a normal sinus rhythm with an incomplete left bundle branch block. Transthoracic echocardiography disclosed a circumferential pericardial effusion with a compressed right atrium and increased respiratory variations of tricuspidal mitral Doppler velocities. Left ventricular systolic function was normal, without regional wall motion abnormality. Contrast-enhanced thoracic CT scan ruled out an acute dissection of the ascending aorta and confirmed the presence of the circumferential pericardial effusion (figure...
A pig-tail catheter was placed within the pericardial sac using the subcostal approach under echocardiographic guidance. 500 mL of blood were withdrawn, resulting in a transient improvement of hemodynamics. Rapidly, hypotension resumed despite increasing doses of Norepinephrine (up to 0.7 µg/kg/min) and the pericardial drainage remained productive (450 ml/hour of fresh blood). This prompted a reoperation under extracorporeal circulation. The surgeon confirmed the presence of a hemopericardium with numerous clots in the dependent region of the pericardial sac. An active bleeding was identified at the level of the retroventricular coronary artery and of the epicardial surface which was related to a superficial laceration of the posterolateral wall of the left ventricle. The pericardium was thickened with several sharp calcified plaques in the vicinity of the bleeding areas. Hemostatic patches were placed and the posterior aspect of the pericardium was excised and replaced by a pericardial patch. The postoperative course was uneventful. On day 2, vasopressors were stopped and the patient was successfully extubated. The pathologic examination of pericardial plaques disclosed a calcified pericardium without any evidence of specific tumoral infiltration or inflammatory process, including tuberculosis (figure 2). One month later, the patient remained asymptomatic.

Discussion

Tamponade is a circulatory failure secondary to impaired cardiac filling due to the presence of a compressive pericardial effusion. Patients sustaining cardiac tamponade typically present with tachycardia, reduced cardiac sounds, hypotension, paradoxical pulse and marked systemic venous congestion [4,5]. The occurrence of a tamponade physiology is related to the abrupt development of a compressive pericardial effusion rather than to its absolute volume. Transthoracic echocardiography is key in confidently diagnosing cardiac tamponade. This unparalleled imaging modality depicts the pericardial effusion, allows a
semi-quantitative evaluation of its volume and more importantly discloses the hemodynamic burden on cardiac cavities. Main echocardiographic findings, as reported in the present case, include the diastolic compression of right cardiac cavities, the dilatation of the inferior vena cava without respiratory variations of its diameter, and increased respiratory variations of intracardiac Doppler velocities [1,6-8]. In addition, echocardiography may also identify the origin of cardiac tamponade and help guiding the pericardocentesis, as in our patient.

Lethal cardiac tamponade is frequently related to a hemopericardium which may be related to a ruptured abnormal ascending aorta (e.g., acute aortic dissection) or to a complicated acute myocardial infarction (i.e., wall rupture) [3,9]. In a necropsy series including 461 patients who died from cardiac tamponade, the volume of hemopericardium varied between 150 and 1000 mL [3]. Accordingly, the identification of a hemopericardium is a warning sign preceding a lethal cardiovascular wall rupture or rapidly progressing tamponade. In patients who reach the hospital alive, cardiac tamponade secondary to a hemopericardium is most frequently related to therapeutic invasive procedures (31% of the cases), whereas other etiologies are related to cancer (26%), acute myocardial infarction (11%) or has been reported as essentials (10%) [10]. Rarely, a coronary injury may result in a hemopericardium and cardiac tamponade. In those cases, reported etiologies are coronary artery aneurysm [11] with an incidence of 0.3 to 4.2 % which may be related to atherosclerosis in 50 to 90 % of the cases [9], chest trauma [12], localized infections [13], or which may develop spontaneously [14]. Injury to coronary arteries leading to a hemopericardium have also been described after blunt or open chest trauma, or as a complication of endovascular procedures such as coronary angiography [15]. As far as we know, this is the first case of hemopericardium secondary to a myocardial and coronary artery injury induced by a calcified pericardial plaque.
Conclusion

Cardiac tamponade secondary to the development of a hemopericardium may develop as the result of a myocardial and coronary artery injury induced by a calcified pericardial plaque.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests

The authors declare that they have no competing interests in regard to this article.

Authors' contributions

AC was a member of the ICU team and wrote the paper. FPe, CC, FPa, CE, RB, and LU participated to the management of the patient. PV and BF helped in writing the manuscript and performed the final control of the paper. All authors have read and approved the final manuscript.

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Figure 1:
Contrast-enhanced thoracic CT scan: circumferential pericardial effusion without other abnormalities, in particular aortic lesion.
Figure 2:

Piece of pericardiectomy: calcified pericardial plaque of parietal posterior pericardium