

Myxedema with cardiac tamponade due to massive pericardial effusion with cholesterol crystals. Case report

Mixedema con taponamiento cardiaco por derrame pericárdico masivo con cristales de colesterol. Reporte de caso

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ABSTRACT

The association between pericardial effusion and cholesterol crystals in patients with hypothyroidism has rarely been observed; the first report dates from 1919, J.S. Alexander presented the case of a 32-year-old English man with hypothyroidism, pericardial effusion and heart failure; the drained pericardial fluid described it as «golden paint», the laboratory study showed large amounts of cholesterol crystals. We present the case of a 61-year-old hispanic man who presented cardiorespiratory arrest during the postoperative period of elective surgery. Cardiorespiratory arrest was attributed to cardiac tamponade due to massive pericardial effusion (PE). During the PE study, pericardiocentesis was performed obtaining 1,800 milliliters of liquid with the appearance of «golden paint». The microscopic study of the liquid obtained showed cholesterol crystals and the cytochemical study had exudate characteristics.

RESUMEN

La asociación entre derrame pericárdico y cristales de colesterol en pacientes con hipotiroidismo ha sido pocas veces observada. El primer reporte data de 1919, J.S. Alexander presentó el caso de un varón inglés de 32 años con hipotiroidismo, derrame pericárdico e insuficiencia cardiaca; el líquido pericárdico drenado lo describió como «pintura dorada» y el estudio de laboratorio mostró grandes cantidades de cristales de colesterol. Presentamos el caso de un hombre hispano de 61 años que presentó paro cardiorrespiratorio durante el postoperatorio de una cirugía electiva. El paro cardiorrespiratorio se atribuyó a taponamiento cardiaco por derrame pericárdico masivo. Durante el estudio del derrame pericárdico se realizó pericardiocentesis, obteniendo 1,800 mililitros de líquido con apariencia de «pintura dorada». El estudio microscópico del líquido obtenido mostró cristales de colesterol y el estudio citoquímico tenía características de exudado.

INTRODUCTION

The association between pericardial effusion and cholesterol crystals in patients with hypothyroidism has rarely been observed; the first report dates from 1919, J.S. Alexander presented the case of a 32-year-old English man with hypothyroidism, pericardial effusion and heart failure. The drained pericardial fluid was described as «golden paint», and the laboratory study showed large amounts of cholesterol crystals.¹ Other reports associate myxedema and cardiac tamponade and normal blood cholesterol levels.²

Hypothyroidism is a condition of thyroid hormone deficiency, it is easily diagnosed and treated, and it can be fatal in severe cases if left untreated. The clinical presentation may be heterogeneous, and may be asymptomatic or in its most serious forms as myxedema.³

Pericarditis is the most common pericardial affection around the world, it can be the primary manifestation of a systemic disease or a process not related to it. In the study of pericarditis, it is necessary to distinguish initially between infectious and noninfectious causes.⁴ Cholesterol pericarditis is a term used to define chronic pericardial effusion accompanied by

high amounts of cholesterol, cholesterol crystals or both.⁵

CASE REPORT

A 61-year-old male, hispanic with a family history of a sister with rheumatoid arthritis. Past medical history of stage three chronic kidney disease (CKD) for six years, and type 2 diabetes.

In December of 2017 he underwent laparoscopic cholecystectomy, in the preoperative study a grade IV cardiomegaly was documented by chest radiography; in the immediate postoperative period, he presented cardiorespiratory arrest (CRP) that warranted advanced cardiopulmonary resuscitation maneuvers (CPR), cardiac amines were used and a return to spontaneous circulation was obtained after four minutes of resuscitation. He was admitted to the Intensive Care Unit (ICU), where post cardiac arrest care was given. He was discharged from ICU for improvement and with neurological sequelae.

During the post-cardiac arrest study, a transthoracic echocardiogram was performed that showed a pericardial effusion of 1,800 milliliters with cardiac tamponade data (*Figure 1*), the chest radiograph showed cardiomegaly and, in the electrocardiogram, decreased voltage of the QRS complexes and Q wave. In the initial approach, infectious, metabolic, rheumatological and neoplastic causes were investigated and discarded.

Initial studies report; blood lipids: total cholesterol 219 mg/dL, uric acid 13.3 mg/dL, high density cholesterol 30 mg/dL, low

density cholesterol 134 mg/dL, very low density cholesterol 55 mg/dL, triglycerides 277 mg/dL. The serum electrolytes were: chlorine 100 mmol/L, potassium 4.5 mmol/L, sodium 141 mmol/L, magnesium 2.2 mmol/L. The chemical analysis of blood: serum glucose 87 mg/dL, urea of 34 mg/dL, urea nitrogen 16.0 mg/dL, uric acid 13.3 mg/dL, creatinine serum 1.7 mg/dL. The liver function tests were normal. The glycosylated hemoglobin was 7.3%. The thyroid profile reported total T4 18.76 nmol/L, free T4 < 5.15 pmol/L, total T3 0.580 nmol/L, free T3 < 1.54 pmol/L, TSH > 100,000 μ IU/mL.

The physical examination revealed bloated expression, with jugular plethora, weak heart sounds, normal lung sounds, edema in both legs, left hemiparesis, no arthritis data. His vital signs were normal, temperature of 36.5 °C, blood pressure of 100/60 mmHg, heart rate 78 beats per minute, respiratory rate 16 breaths per minute, 98% oxygen saturation.

Diagnostic and therapeutic pericardiocentesis was performed subcostally and guided by echocardiography, obtaining 1,800 milliliters of liquid material with turbid characteristics, similar to «gold paint». Samples were taken for histopathological study, cultures and cytochemical study.

The cytochemical study reported: turbid liquid, yellow in color; leukocytes, 19 cells per milliliter. Erythrocytes: 850 cells per milliliter, of which 80% were crenocytes; Lactic dehydrogenase 269 IU/L, Total protein 6.0 g/dL, albumin 3.3 g/dL, glucose 98 mg/dL, chlorine 102 mmol/L. No microorganisms were observed by Gram stain. In the culture



Figure 1: Two-dimensional transthoracic echocardiogram, severe pericardial effusion, approximately 1,800 mL volume, with diastolic collapse of right cavities, alternation in transmitral and tricuspid gradient, echocardiographic data of cardiac tamponade.

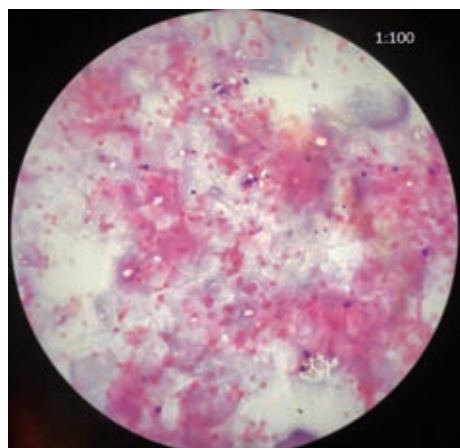


Figure 2: Staining with eosin and hematoxylin of cytological material product of pericardial fluid seen with light microscope at 100 magnification (1:100), deposits of cholesterol crystals are observed.

of pericardial fluid there was no bacterial development after 72 hours.

The pericardial fluid studied by microscopy and stained with Eosin-Hematoxylin showed abundant deposits of cholesterol crystals (Figure 2).

DISCUSSION

Pericarditis is the most common pericardial condition in the world, it affects more young and middle-aged men, the prognosis is determined by the age of the patient and the etiology. The etiology of pericarditis can be differentiated between infectious and noninfectious causes, in developing countries where there is a high prevalence of tuberculosis, this represents 70% of cases of pericarditis. In developed countries, the prevalence of tuberculosis with pericarditis is less than 5%.⁴

Cholesterol pericarditis is a rare type of pericarditis, characterized by chronic pericardial effusion with high concentrations of cholesterol, cholesterol crystals, or both. There are about 100 cases described in the world literature, the majority of cases are associated with rheumatoid arthritis⁵⁻⁸ followed by thyroid disease with or without myxedema^{9,10} and few cases described where no primary cause is found.^{5,8} Clinically, manifest

as constrictive pericarditis, cardiac tamponade or asymptomatic course.^{5,7,8}

In hypothyroidism the pericardial effusion is attributed to serositis, where changes in vascular capillarity play an important role. Changes in lipid metabolism and poor absorption capacity of the pericardium may be responsible for high cholesterol levels in the pericardial fluid. It is believed that the movement caused by the heartbeat could be related to precipitation in cholesterol crystals, that in the pericardium they trigger a granulomatous response that results in fluid of the exudate type.^{5,8,10}

The treatment consists of pericardiocentesis, pericardiotomy, pleuropericardial window and treatment of the underlying disease.^{1,5-9}

CONCLUSIONS

In the case of our patient, it is a man with a diagnosis of hypothyroidism and myxedema clinic, and massive pericardial effusion that caused cardiac tamponade. No infectious or autoinflammatory causes of pericardial effusion were found. Clinical manifestations before diagnosis were dyspnea on exertion, edema of both legs without arthritis. After pericardiocentesis continued oral treatment with levothyroxine 100 mcg daily, after twelve months of follow-up there have been no recurrences.

The increase in the diagnosis of this condition due to advances in cardiac imaging tests, leads us to believe that pericardial effusion due to cholesterol crystals has remained underdiagnosed so far. The high incidence of hypothyroidism, the heterogeneity of its presentation from the subclinical form to its most serious type, myxedema, invites clinicians to take it into account in the approach to chronic pericardial effusion, especially when it is massive and conditions cardiac tamponade. Likewise, we emphasize the relevance of the histopathological study of pericardial fluid in the search for cholesterol crystals and other findings that can orient us towards the etiology.

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Conflict of interests

The authors declare no conflict of interests.

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