

CASE REPORT

Long-evolution ascites in a patient with constrictive pericarditis

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ABSTRACT

Constrictive pericarditis (CP) is an uncommon disease resulting from chronic pericardial inflammation, fibrosis and calcification. Since there are atypical forms of presentation, with subtle or nonexistent cardiorespiratory symptoms, diagnosis may be challenging and difficult. Recurrent ascites in patients with congestive hepatopathy due to constrictive pericarditis is, in most cases, reversible after pericardiectomy. Nevertheless, development of persistent liver dysfunction may be a long-term complication.

The present case describes a 23 years old man with growth delay, dyspnoea and long evolution ascites, whose exhaustive etiological investigation led to diagnosis. Afterwards the patient underwent elective surgery with symptom and general condition improvement.

Ascites differential diagnosis and its association with constrictive pericarditis are briefly reviewed in this article.

Key words: Constrictive pericarditis. Ascites. Congestive hepatopathy.

ABBREVIATIONS

CP: Constrictive pericarditis; AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; GGT: Gama glutamil transferase; INR: International normalized ratio; TSH: Thyroid stimulating hormone; FT4: Free thyroxine; AMA: Anti mitochondrial antibodies; ASMA: Antis-smooth muscle antibodies; ANCA: Anti-neutrophil cytoplasmic antibodies; ANA: Anti-nuclear antibodies; Anti-LKM1: Anti-liver kidney microsomal type 1 antibodies; HAV: Hepatitis A virus; HBV: Hepatitis B virus; HCV: Hepatitis C virus; HIV: Human Immunodeficiency virus.

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INTRODUCTION

Constrictive pericarditis is an uncommon disease resulting from chronic pericardial inflammation, fibrosis and calcification. The thickened pericardium adheres to the underlying myocardium, which restricts ventricular diastolic filling (1).

Clinical presentation of CP is heterogeneous and is associated with decreased cardiac output and venous system congestion. Symptoms such as dyspnea, abdominal pain and peripheral oedema are common and most patients have jugular venous distension on physical examination (2).

The electrocardiogram is not characteristic and may reveal nonspecific repolarization changes and low-voltage electrical activity. The presence of pericardial calcification on chest radiograph is typical but not routinely found. Echocardiography offers important clues that strongly suggest the diagnosis but CT scan and MRI are the most sensitive methods to identify pericardial thickening. Heart catheterization with analysis of intracavitary pressure curves is the gold standard to confirm the diagnosis (1-6).

The treatment of choice is surgical pericardiectomy and overall prognosis is good (1-6).

CP is a complex disease, systemic in nature, and many of the diagnostic problems come from its insidious course and lack of distinctive cardiopulmonary symptoms. A particular subgroup of patients may represent an interesting diagnostic challenge, presenting with ascites and signs of chronic liver disease (4).

The present article discusses a rare etiology –constrictive pericarditis– of a very common clinical sign –ascites. We intend to highlight CP diagnosis in patients with ascites of unknown cause showing the importance of its early detection and differential diagnosis to prevent liver disease.

CASE REPORT

We present a 23 years-old black man from São Tomé and Príncipe, who was admitted to our department with a long evolution ascites for investigation.

The patient was said to be healthy up to 8 years old, when a diagnosis of asthma was established due to recurrent crisis of dyspnea and wheezing. By the age of sixteen, he began to realize a slow increase in his abdominal size. In the last years, he had several hospital admissions in his country with dyspnea, jaundice, abdominal pain and ascites. He was transferred to Portugal owing to progressive worsening.

His past medical history had no relevant data, such as other diseases, previous surgery or known allergies. He had no smoking or drinking habits. His medications included salbutamol, spironolactone, furosemide and aminophylline.

His father, sister and brother had asthma. No family history of heart, liver or gastrointestinal disease was known.

He was further examined in a gastroenterology outpatient consultation. Malnutrition was evident (BMI – 19.9 kg/m²). He had no jaundice or jugular distension. Heart auscultation was normal. Lung auscultation detected diminished breath sounds at the lower right lung. Abdomen examination revealed a mild hepatomegaly and moderate ascites (grade 2).

Laboratory testing showed: AST - 40 U/L (< 37), ALT - 24 U/L (< 49), GGT - 111 U/L (< 30), alkaline phosphatase - 213 U/L (45-129), Total bilirubin - 0.77 mg/dl (< 1.0), albumin - 3.1 g/dl (3.2-4.8), INR - 1.04 (0.9-1.1), urea - 37 mg/dl (10-50) and creatinine - 0.6 mg/dl (0.7-1.3). TSH - 3.1 µg/dl (0.35-5.56) and FT4 - 1.2 ng/dl (0.89-1.80). Serum protein electrophoresis was normal as well as full blood count and urine assessment. Autoimmune study (AMA, ASMA, ANCA, ANA, anti-LKM1 and antitransglutaminase antibodies), viral serologies (HAV, HBV, HCV, HIV), anti-*Schistosoma* antibodies and assays for syphilis and leishmaniasis were negative. α1 antitrypsin, copper and iron stores were within the normal range. α-Fetoprotein - 2.1 ng/ml (< 7.0). Brain natriuretic peptide - 742 pg/ml (< 145).

Paracentesis was performed and fluid analysis showed a serum-ascites albumin gradient of 1.5 g/dl and 2.5 g/dl of total proteins. Spontaneous bacterial peritonitis was ruled out (polymorphonuclear cells < 250 and ascites microbiological tests was negative). Abdominal ultrasound revealed an enlarged and heterogeneous liver with irregular contours and dilatation of hepatic veins (Fig. 1). Gastroduodenoscopy did not show oesophageal varices. Duodenal biopsies and total colonoscopy were normal and rectal histology was negative for *Schistosoma spp.*

Electrocardiogram revealed nonspecific repolarization changes and findings compatible with right ventricular overload. Transthoracic echocardiogram showed dilatation of the left atrium and right heart chambers with mild tri-



Fig. 1. Abdominal ultrasound showing a heterogeneous liver with marked dilatation of hepatic veins ("goose foot" sign).

cuspid regurgitation. Systolic function was normal and the pericardium had no visible changes. Heart MRI detected a thickened pericardium (> 4 mm). An abnormal motion of the interventricular septum with a typical pattern of constriction was also seen.

A transjugular liver biopsy with hemodynamic monitoring supported the diagnosis of CP, showing high pressures in inferior vena cava and hepatic veins (14 mmHg) and equalization of right atrial pressure (19 mmHg), pulmonary capillary wedge (20.5 mmHg) and right ventricle diastolic pressures (20 mmHg). Liver histology showed marked sinusoidal dilatation, inflammation of portal spaces, megamitochondria and fibrous septa. Liver cirrhosis was not detected.

To investigate respiratory symptoms, our patient underwent respiratory function tests showing a severe restrictive pattern and hypoxemia (PaO₂: 73.9 mmHg, PaCO₂: 38.1 mmHg). CT scan revealed a large cardiomegaly associated with pericardial and pleural calcification, right middle lobe atelectasis and scattered bronchiectasis (Fig. 2). A bronchoscopy was further performed and showed a narrowing of the right lower bronchus and right middle lobe bronchus. Bronchoalveolar lavage and bronchial biopsies were negative for malignancy and *Mycobacterium tuberculosis*. Mantoux test was non-reactive and sweat test was negative. The diagnosis of CP with long-term congestive hepatopathy was established and the association with anatomical and functional respiratory changes in this case was probably due to tuberculosis sequelae.

Further, the patient underwent pericardiectomy with no postoperative complications. Surgical specimen histology revealed nonspecific fibrotic changes. After surgery, he remained ambulatory follow-up with a favorable outcome. Fatigue and dyspnea resolved, nutritional status improved (BMI - 26.4 kg/m²) and ascites gradually disappeared.

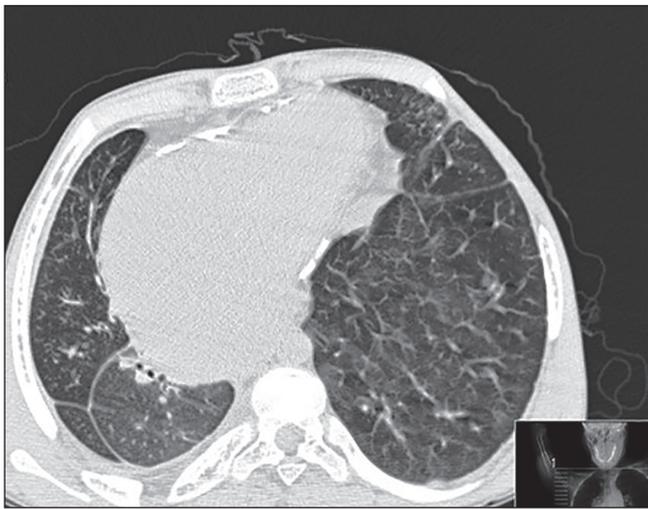


Fig. 2. CT scan showing mediastinum deviation, pericardial and pleural calcifications, right middle lobe atelectasis and bilateral bronchiectasis.

DISCUSSION

In 1986, the designation of Pick disease was first described showing the association between CP, ascites and hepatomegaly. This work presents a young patient with an unusual cause of ascites, nevertheless other similar cases have been previously reported (7).

About 70 to 80% of patients with ascites have liver cirrhosis. Less common causes associated with portal hypertension are all diseases causing heart failure (3% of patients), fulminant hepatic failure and vascular obstruction (veno-occlusive disease, Budd-Chiari syndrome and inferior vena cava obstruction). Malignant neoplasms and peritoneal tuberculosis comprise 10 and 2% respectively. Ascites of renal (nephrotic syndrome), endocrine (myxoedema), autoimmune (systemic lupus erythematosus) and pancreatic aetiology (pseudocyst or pancreatic duct rupture) are miscellaneous causes that sum 10% of the reported cases (8-11).

In young people, liver cirrhosis is uncommon (9-11) and less obvious causes beyond ethanol consumption and viral infection must be excluded. In our patient, considering the young age and long term respiratory symptoms, genetic diseases with liver and lung impairment or heart failure (due to *cor pulmonale*, structural congenital defect, pericardial disease or cardiomyopathy) were possible. However, we exclude α 1-antitrypsin deficit based in serum assay and cystic fibrosis through the sweat test.

Jugular venous distension is typical (2) but it was not present in this patient. Similarly, other suggestive signs of right heart failure were not evident on physical examination, with exception of ascites and hepatomegaly, present in 45% and 63% of CP patients respectively (7).

In most cases, patients with heart failure have high serum brain natriuretic peptide levels caused by raised intracavitary pressures and ventricular wall distension. In

CP, this distension is limited by a rigid and non-extensible pericardium and values are not so high when compared with diseases that directly involve the myocardium (2).

Paracentesis was consistent with portal hypertension (serum-ascites albumin gradient > 1.1) but high total protein concentration (≥ 2.5 g/dl) was uncommon in liver cirrhosis. This biochemical pattern is suggestive of post-sinusoidal ascites and is associated with overproduction and exudation of a protein rich lymph fluid into the peritoneal space caused by high vascular pressures and restriction of normal blood flow (8,12). The presence of dilated hepatic veins on abdominal ultrasound was typical.

There are no pathognomonic electro or echocardiographic findings and these exams do not exclude CP diagnosis (5). Ventricular repolarization changes found in patient's electrocardiogram were nonspecific and echocardiogram did not help too much. A faster and early ventricular filling that abruptly ends in early diastole, an abnormal interventricular septum motion, the inferior vena cava and hepatic veins congestion with no inspiratory collapse, and the normal ventricle size with normal systolic function, are signs of CP not described in our patient (5).

CT scan and MRI together with the hemodynamic study performed during transjugular liver biopsy made the diagnosis. High pressures in right atrium, prominent X and Y descents in venous pressure curves, the hemodynamic *Kussmaul sign*, the square on root sign in ventricular pressure tracings and the equalization of diastolic pressures in the four heart chambers (variation ≤ 5 mmHg), are associated with heart constriction (1,2,4), and some of those findings were found in this case.

Tuberculosis, the leading cause of CP worldwide, is responsible for few cases in developed countries, mostly in patients with chronic HIV infection. CP may also develop after a pericardial acute infection, particularly when pyogenic bacteria are involved (2). Although 40% of the cases remain idiopathic (3), non-infectious causes, such as radiotherapy, heart surgery, connective tissue diseases, terminal renal failure and metastatic tumor dissemination have become increasingly prevalent (2).

In our case, the pulmonary lesions and pleuropericardial calcifications detected on CT scan causing severe restrictive ventilatory changes have suggested the diagnosis of tuberculosis sequelae when taking into account the patient ancestry and high prevalence of *Mycobacterium tuberculosis* infection in Africa.

The young age, comorbidities and disease impact on patient status were decisive factors considered for surgery. Mortality associated with pericardiectomy depends on the centre experience ranging between 5-15%. Results are better when surgery is early performed, as persistent changes in heart filling may become irreversible (6).

Congestive hepatopathy do not exhibit a typical pattern on liver function tests. A slight increase in total bilirubin levels is the most consistent change occurring in at least 70% of the patients (4,12-14). Failure of liver synthesis

(decreased albumin and prolonged prothrombin time) is not uncommon at diagnosis, leading to a worst outcome (13).

Histologic features includes marked sinusoidal dilatation, necrosis and atrophy of centrilobular hepatocytes. The fibrous pattern is typical with septa that form bridges between central venules and sparing portal spaces. Periportal hepatocytes turnover may result in a histological pattern known as nodular regenerative hyperplasia. Nevertheless, the histological criteria for cirrhosis are rarely satisfied and classical designation of “cardiac cirrhosis” has been abandoned (13).

Prognosis of congestive hepatopathy depends on the underlying condition (13).

The present work aimed to highlight CP as a cause of ascites in a society where liver cirrhosis is responsible for most cases. Given the diagnostic subtlety, it is necessary to maintain a high level of suspicion as only well-timed therapy predicts a favorable outcome.

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