

**Case Report**

# The Panzer Heart: A Surgical Challenge

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**Abstract:** Introduction constrictive pericarditis is an inflammation of pericardium, they develops progressive fibrotic, calcified the pericardium and compressed the myocardium. The aim of this study is to present a case of massive calcified pericardium and to describe the difficult of surgery. Method A 30-year-old woman was admitted in cardiovascular hospital after 7 years of dyspnea, weakness, fatigue, ascites and palpitation. She had been diagnosed with on tuberculosis 8 years before and had complied with anti-tuberculosis chemotherapy. Treatment consists of 4 drugs therapy (rifampicin, isoniazid, pyrazinamide and ethambutol) for 2 months followed by 2 drugs (rifampicin, isoniazid) for 4 months with adjuvant treatment including vitamin B. Clinical examination showed symptoms of right heart congestion including congestive liver; ascites dilated jugular vein and leg edema. Chest radiography showed massive pericardial calcific deposits encircling the left and the right ventricle. Two dimensional echocardiography revealed severe pericardial calcification with right systolic ventricular dysfunction, dilatation right atrium and inferior vena cava. Chest thoracic scanner was performed and precise the topography of calcification. Right cardiac catheterism was not performed. Abdominal ultrasound showed ascites and cardiac-like liver. The transaminases were high. Result A subtotal pericardiectomy was performed through a median sternotomy without cardiopulmonary bypass (CPB). The anterior, lateral and inferior pericardium was resected between the right and left phrenic nerve using the ultrasonic scalpel. Massive calcified are as were first irrigated with hot physiologic serum, in order to fracture the plaque and dissect it from myocardium without coronary lesion. Our patient was discharged to the hospital 8 days later, electrocardiogram showed atrial fibrillation. After 3 months she no longer presents dyspnea and ascites. Conclusion Surgical decompression of right cardiac cavities in massive calcified pericarditis induce increasing of right signs and restoration of the right ventricular function.

**Keywords:** Calcific Pericarditis, Surgery, Tuberculosis

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## 1. Introduction

Constrictive pericarditis is an inflammation of pericardium, They develops progressive fibrotic and calcified change in The pericardium compresses the myocardium, causing the impairment of ventricular diastolic filling [1].

The chronic constrictive pericarditis is characterized by an impairment of myocardial relaxation due to limitation by a rigid pericardium.

The imprisonment of the heart by a rigid, fibrotic and calcified pericardium results in characteristic physiopathologic effects, including impaired diastolic filling of the ventricles, exaggerated ventricular interdependence and dissociation of intracardiac and intrathoracic pressures during respiration [2].

It is almost associated with infection, the most frequent etiology in under development countries is tuberculosis infection [3].The surgical treatment of this chronic disease is pericardiectomy. The objective of pericardiectomy is to decrease the compression of cardiac cavities.

## 2. Case Presentation

A30-year-old woman was admitted in our cardiovascular surgery clinic after 7 years of dyspnea (classe III-IV on NYHA), weakness, fatigue, ascites and palpitation.

She had been diagnosed with on lung tuberculosis 8 years before and had complied with antituberculosis chemotherapy. Treatment consists of 4 drugs therapy (rifampicin, isoniazid, pyrazinamide and ethambutol) for 2 months followed by 2 drugs (rifampicin, isoniazid) for 4 months with adjuvant treatment including vitamin B. After treatment biomarkers of tuberculosis are negative.

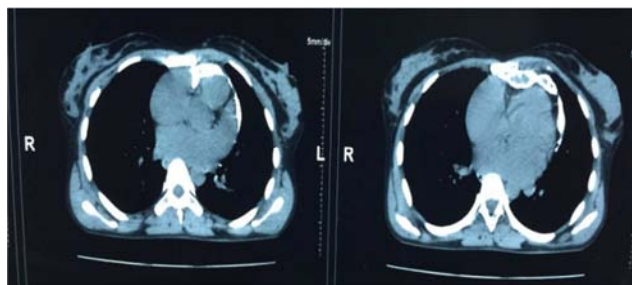
Clinical examination showed symptoms of right heart congestion including congestive liver, ascites dilated jugular vein, leg edema and diminished heart sounds. Primary laboratory findings are elevated serum cholestasis markers including bilirubin, transaminases, alkaline phosphatase and glutamyl transpeptidase and lactate dehydrogenase levels. Electrocardiogram showed sinus rhythm with generalized low voltage and non specific repolarization changes.

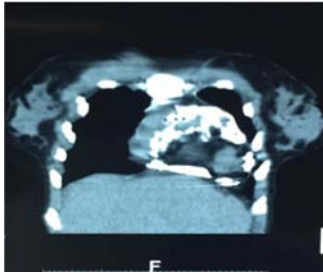
Chest radiography showed massive pericardial calcific deposits encircling the left and the right ventricle (figure 1). Pericardial calcification was found over the right-sided cardiac chambers, in the atrioventricular grooves, in the base of the left ventricle, and over the apex of the left ventricle.



**Figure 1.** Massive calcified pericarditis.

Two dimensional echocardiography revealed severe pericardial calcification with right systolic ventricular dysfunction, dilatation of right atrium and inferior vena cava. The left ventricular ejection fraction is preserved. Chest thoracic scanner was performed and precise the topography of calcification (figure 2).



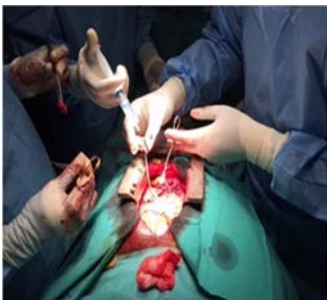
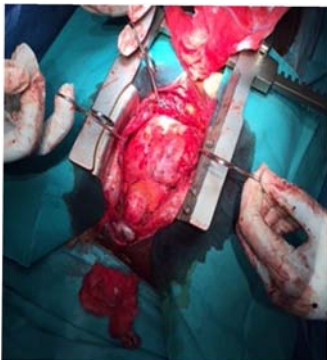


**Figure 2.** C-T scanner of calcific pericardium.

Right cardiac catheterism was not performed. Abdominal ultrasound showed ascites and cardiac-like liver. The transaminases were high.

A subtotal pericardiectomy was performed through a median sternotomy without cardiopulmonary bypass (CPB). Macroscopically, the calcific pericardium was found to be markedly thickened and hard, and was strongly adherent to the myocardium, especially along the inferior surface of the right ventricle. The anterior, lateral and inferior pericardium was resected between the right and left phrenic nerve using the ultrasonic scalpel (figure 3). Massive calcified areas were first irrigated with hot physiologic serum, in order to fracture the plaque and dissect it from myocardium without coronary lesion.

Where possible, constrictive calcific layers of epicardium were removed. Postoperatively his central venous pressure decreased from 18 to 7 mmHg. Our patient receives antitubercular treatment in the postoperative period and she was discharged to the hospital 8 days later, electrocardiogram showed atrial fibrillation. She had tuberculosis medications and anticoagulation. Ascites increased under low dose of diuretic and left ventricular function is good. Transaminases are normalized and the hepatomegaly is completely decreased. During the 3 postoperative months she was in NYHA functional class II.



**Figure 3.** Surgical resection of the calcific pericardium.

### 3. Discussion

Constrictive pericarditis is an uncommon disorder with various causes. Although most often idiopathic, it may also occur after cardiac surgery, mediastinal radiotherapy, collagen diseases, mesothelioma and tuberculosis [4].

The lead cause of pericarditis in non industrial countries is tuberculosis [5]. In Africa the Human immunodeficiency virus (HIV) epidemic has been associated with an increase in all forms of extra pulmonary tuberculosis including tuberculosis pericarditis. Tuberculosis is responsible for approximately 70% of cases of large pericardial effusion and most cases of constrictive pericarditis in developing countries [6].

In our case the suspected etiology was tuberculosis without HIV infection; which had developed 8 years earlier. No specific etiology was found after bacteriological and histopathological analysis. In our case we use two dimensional echocardiography and CT scanner in the diagnosis. Echocardiography has a central role in the initial diagnosis. Some particular signs, such as an abnormal inspiratory shift of the interventricular septum, increased respiratory variations of trans mitral, trans tricuspid and hepatic vein flow velocities and the normality of early diastolic relaxation velocity at tissue Doppler. Madeira M [7] suggests using the two-dimensional speckle tracking echocardiography (2DSTE) and he said that: Trans thoracic echocardiography has a pivotal role in the diagnosis of constrictive pericarditis.

In addition to the classic TM mode, two dimensional and Doppler echocardiography, newer methodologies designed to evaluate myocardial mechanics, such as two-dimensional speckle tracking echocardiography (2DSTE), provide additional diagnostic and clinical information in the context of constrictive pericarditis. Research has demonstrated that cardiac mechanism can improve echocardiographic diagnostic accuracy of constrictive pericarditis and aid in differentiating between constrictive and restrictive ventricular physiology. 2DSTE can also be used to assess the success of pericardiectomy. Cardiovascular magnetic resonance imaging is used as a full imaging modality for addressing the challenges of confirming this diagnosis. It can be used to exclude the other etiology of right heart failure (pulmonary hypertension, congestive cardiomyopathy and myocardial infarction) [8].

Sometime it is difficult to find difference between restrictive cardiomyopathy and constrictive pericarditis. Restrictive cardiomyopathy are characterized by diastolic dysfunction while systolic function is preserved. Magnetic resonance imaging is helpful to characterize cardiac tissues and find nodular fibrosis and calcified nodules based on the underlying etiology in the presence of constrictive pericarditis

Several surgical procedures have been proposed in chronic constrictive pericarditis but no consensus exists on the choice of methods [9].

In this case we are choice to realize subtotal pericardiectomy through a median sternotomy without CPB [10]. There was none intraoperative hemorrhagic complication. In case of massive calcification surgical treatment of ten requires extensive pericardial dissection .To avoid bleeding and malignant arrhythmia some authors used ultrasonic scalpel and sternal retractor with a suction heart positioned [11].

In case of massive calcifications with beginning of alteration of right ventricular function, operative risk is still high, and even after surgery right ventricular function could still altered. After pericardiectomy, we can have acute right ventricular failure. Some authors have used successful extracorporeal membrane oxygenation in case of acute right ventricular failure after pericardiectomy, In case of right ventricular failure cardiac assistance with extracorporeal life support is a good alternative [12].

Pericardiectomy under extracorporeal circulation, reduce the heparin induced operative blood waste, restore cardiac function, in mild cost on such poor patients. But in the follow-up some patients present right ventricular failure with liver dysfunction [13]. For some authors, total pericardiectomy is associated with lower perioperative and late mortality, and confers significant long-term advantage [14]. Bozbuga [15] determine the negative predictors factors of survival after pericardiectomy for constrictive tuberculosis pericarditis: advanced age, atrial fibrillation, concomitant tricuspid insufficiency, inotropic support, and low cardiac output. Our patient has only atrial fibrillation.

## 4. Conclusion

We present a patient with massive calcific chronic pericarditis which has good postoperative results who underwent subtotal pericardiectomy.

Pericardiectomy is the standard procedure in the treatment of constrictive pericarditis with low mortality and excellent functional out comes in mid-term.

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