



RESEARCH ARTICLE

PERICARDIECTOMY FOR TUBERCULOUS EFFUSIVE-CONSTRICTIVE PERICARDITIS

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Abstract

Effusive-constrictive pericarditis is an uncommon condition characterized by concomitant existence of pericardial effusion and constriction caused by the visceral pericardium. Tuberculosis remains the main cause in developing countries. The clinical profile of our case is presented as well as a discussion of the definition, etiologies, indications for surgery and surgical management.

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Introduction:-

Effusive-constrictive pericarditis (ECP) is a condition in which the visceral pericardium constricts the heart in the presence of a tense pericardial effusion. Both disorders lead to impediment of ventricular filling and, therefore, reduction of cardiac output. In Africa, tuberculosis remains the main cause, while in developed countries the main etiologies are: idiopathic, mediastinal radiation and previous cardiac surgery. The persistence of increased right atrial pressure after the removal of pericardial fluid is the hallmark of ECP. The use of cardiac catheterization while performing pericardiocentesis is then required for the diagnosis. In our case, the diagnosis was made by postpericardiocentesis echocardiography. The surgical management consisted of pericardiectomy of both parietal and visceral layers of pericardium.

Case Report

We report a case of 25-year-old man presented to our institution for cardiac tamponade who underwent urgent pericardiocentesis. Medical treatment which consisted of oral administration of anti-inflammatory agent was instituted. During the follow-up and despite the drainage of pericardial fluid, the patient still complains from symptoms of right heart failure unresponsive to medical treatment. Transthoracic echocardiography revealed the presence of abnormal septal motion with diffuse pericardial thickening. Doppler showed typical respiratory variation of mitral inflow and expiratory diastolic flow reversal in the hepatic veins. These echocardiographic features are Concordant with the diagnosis of constrictive pericarditis. We decided to realize pericardiectomy.

Our surgical goal was to perform total pericardiectomy without cardiopulmonary bypass (CPB) if feasible. After sternotomy and in order to achieve adequate exposure of both anterior and lateral side of pericardium, we managed to separate it from pleural adherence without opening the pleural cavity as possible as we could. For dissection, we used either cautery or scissor. The pericardium was opened vertically and anteriorly along the cephalo-caudad direction. First, we decorticated the pericardium over the aorta and the right atrium to facilitate the institution of CPB if it is necessary. The cleavage plane between the thickened parietal and visceral pericardium was identified

and we proceeded to the removal of all the parietal pericardium with the conventional phrenic to phrenic pericardiectomy (Fig 1). The removal of visceral pericardium was difficult and time consuming because of the high risk of bleeding and coronary artery damage requiring sharp dissection of many small fragments (Fig 2). Islands of visceral pericardium were left intentionally.

The patient had low-output syndrome on postoperative course which needed moderate doses of inotropic agents. He was discharged from the hospital on postoperative day 10. Subsequent follow-up revealed resolution of the anasarca with favorable functional status.

The patient had confirmation of tuberculous pericarditis from the histopathological examination of the excised pericardium. The antituberculous chemotherapy was administered which consisted of triple-drug therapy for 9 months (isoniazid, rifampin, and ethambutol).

During the time he was hospitalized and after the surgery, the patient was delighted with the care he received and was optimistic about the outcome of his condition.

Discussion:-

The first pericardiectomy was performed successfully in 1913 by Ludwig Rehn of Frankfurt [1]. Hancock [2] in 1971 was the first to describe the clinical and hemodynamic profile of 13 patients with Effusive-constrictive pericarditis (ECP) undergoing pericardiectomy.

ECP is a distinct entity which is characterized by an impairment of cardiac filling caused by two mechanisms: fluid accumulation within the pericardial space and constriction caused by a visceral pericardium. It is defined as the persistence of increased right atrial pressure after removal of pericardial fluid. Combined pericardiocentesis and cardiac catheterization are then required for the diagnosis. This invasive hemodynamic assessment was not available in our institution.

In the literature, the prevalence of ECP varies from 1.4% to 14.8% [3]. Sagristà-Sauleda et al. [4] in the only prospective study of 1184 patients with pericarditis and 218 patients with tamponade, 15 patients (respectively 1.3% and 6.8%) had ECP. Echocardiography found constriction before removal of pericardial fluid in only 7 of 15 patients. Kim KH et al. [5] in a cohort of 205 patients, the incidence of ECP after pericardiocentesis was 16%. In this study, echocardiography was the main tool for establishing the diagnosis and not the cardiac catheterization. An African prospective review by Salami et al. [6] reported the prevalence of 13% of ECP among patients with pericardial disease of any type.

In our case, pre-pericardiocentesis echocardiography failed to assess the diagnosis because the evaluation was limited to obtain basic information about pericardial fluid location. The persistent symptoms of right heart failure after pericardiocentesis raised the suspicion of concomitant existence of constriction.

Echocardiographic assessment post pericardiocentesis of ECP necessitates comprehensive observation. Abnormal ventricular septal motion (as a result of increased ventricular interdependence) and dissociation of intrathoracic and intracardiac pressures are the key features of constriction [17].

Idiopathic etiology represents the main cause of ECP in western world [4] followed by mediastinal radiation and previous cardiac surgery [5,7]. Tuberculosis is still the principal cause in developing countries with a reported incidence ranging from 23 to 91% [8, 9, 10]. *Mycobacterium tuberculosis* bacilli can reach the pericardium indirectly by lymphatic or hematogenous dissemination or directly by contiguous spread from neighboring structures [11].

Many different approaches have been described for pericardiectomy including median sternotomy, bilateral thoracotomy and left anterolateral thoracotomy [12]. Our patient underwent surgery by a median sternotomy, which provides good access and a better possibility of extensive resection. Also, it allows the use of CPB in the event of severe hemorrhage.

The involvement of the visceral pericardium distinguishes ECP and its surgical removal is challenging. Both visceral and parietal pericardium must be resected which is associated with increased mortality and morbidity [7]. The operative mortality varies among series from 5% to 10% [13]. Yangni-Angate et al. [14] in a retrospective study

of 120 patients who had undergone pericardiectomy for tuberculous constrictive pericarditis, the hospital mortality was 12.5%. the main cause of death in this study was a low cardiac output syndrome.

In our case and during the surgical management, islands of visceral pericardium are left intentionally because of high risk of bleeding and coronary artery damage. This may explain the occurrence of lowoutput syndrome that our patient presented during the early postoperative phase. However, in a retrospective study of 36 patients who had undergone pericardiectomy for constrictive tuberculous pericarditis, Bozbuga and colleagues [15] demonstrated that some patients will develop low-output syndrome regardless of the extent of pericardial resection and highlighted the myocardial involvement in this outcome. Indeed, long period of constriction may lead to myocardial fibrosis and atrophy [16]. Due to this risk associated with the chronicity of the disease, pericardiectomy is recommended once ECP has been diagnosed.

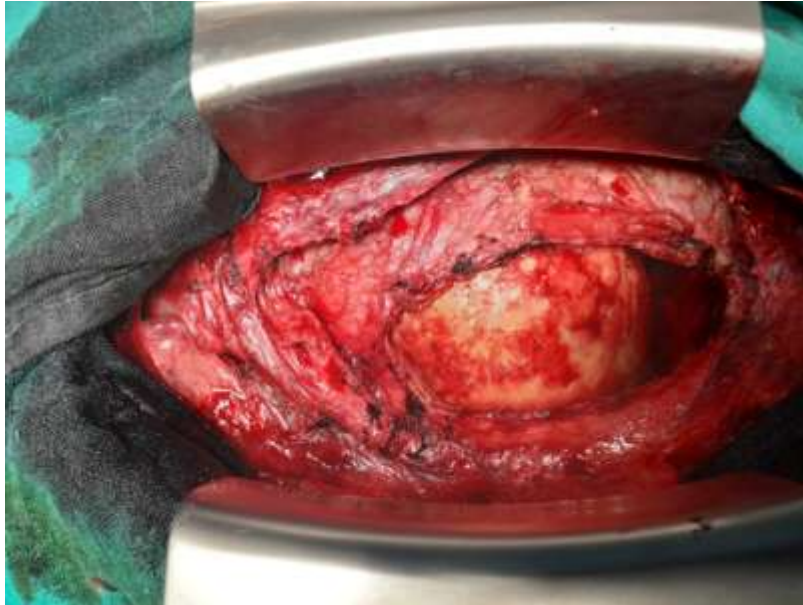


Fig 1:- Operative view showing extensive thickening of both the parietal and visceral pericardial layers with a free pericardial space (location of fluid before pericardiocentesis). The adherence of visceral pericardium to the underlying myocardium is severe.



Fig 2:- The thickening pericardium after phrenic to phrenic pericardiectomy. In the left, fragments of visceral pericardium.



Fig 3:- Final operative view after excision of both parietal and visceral pericardium. Islands of visceral pericardium are left intentionally because of high risk of bleeding.

Conclusion:-

In ECP, the implication of visceral pericardium in the mechanism of constriction is well established making its surgical removal the only curative and effective long-term treatment. The timing of intervention is important and should be early to avoid complications of long period of constriction.

Disclosure

The authors declared no conflicts of interest. Oral consent was obtained from the patient to publish this case report.

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