

CASE REPORT

Trapped heart in heavily calcified pericardium

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Abstract

Constrictive pericarditis is a disabling disease of the heart, which causes cardiac diastolic dysfunction. We present a case of a 44-year-old gentleman with a history of blunt chest trauma who presented with constrictive pericarditis with right-sided heart failure. Imaging studies revealed a calcified pericardium. He underwent an uneventful pericardiectomy. Calcification is common yet rare if it involves the pericardium. It normally occurs following fibrosis and adhesion which are associated with the chronicity of the disease, hence creating more challenge to the operating surgeon in the pericardiectomy procedure.

INTRODUCTION

Pericardial calcification (PC) usually develops after trauma or chronic pericarditis. In developing countries, the primary cause of PC is tuberculosis [1]. Other factors namely chronic idiopathic pericarditis, post-cardiac surgery and mediastinal irradiation are among the aetiologies that can lead to the formation of calcified pericardium [2]. It is important to differentiate either the calcification is dystrophic or malignant as the former is benign and more common than the later. Constrictive pericarditis can be caused by PC. It is a treatable disease with poor prognosis if it is left untreated. The clinicians therefore need to have a high alert for this condition if they encounter a patient with symptoms of predominant right heart failure especially in a patient with a history of cardiac surgery, pericarditis or pericardial effusion as well as chest trauma. In this case report, we highlight our first experience in managing a case of constrictive pericarditis that was presented with severe PC and discuss our approach.

CASE REPORT

A 44-year-old gentleman with no underlying medical illness presented with worsening symptoms of heart failure over the past 2 years. The symptoms mainly restricted his effort tolerance such as climbing stairs and walking a great distance. It was also associated with bilateral leg swelling and abdominal distension. Otherwise, he denied any chest pain, orthopnoea or paroxysmal nocturnal dyspnoea.

He revealed a history of a high-impact motor vehicle accident (MVA) about 7 years ago. As a result, he sustained blunt chest trauma after his chest had been knocked onto the steering wheel. He otherwise did not have any other injuries. Post-MVA, he claimed to feel some chest discomfort but did not seek any treatment as it was tolerable.

He was well until 2 years ago when he started to feel some restrictions in his daily activities especially when climbing up stairs. The symptoms had worsened over time and he started

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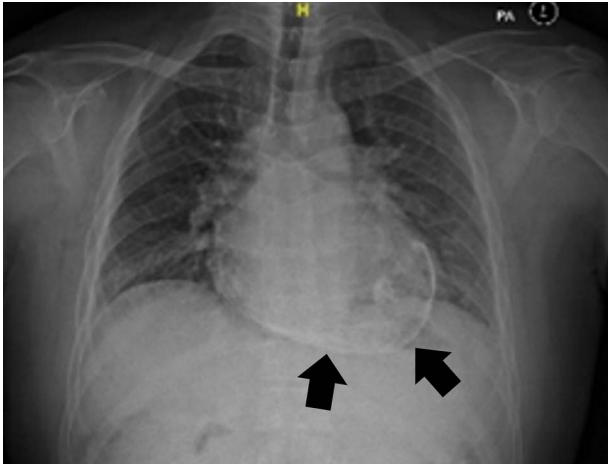


Figure 1: Chest radiograph showing crescent-shaped calcified rim along cardiac borders (arrow) implicating PC.

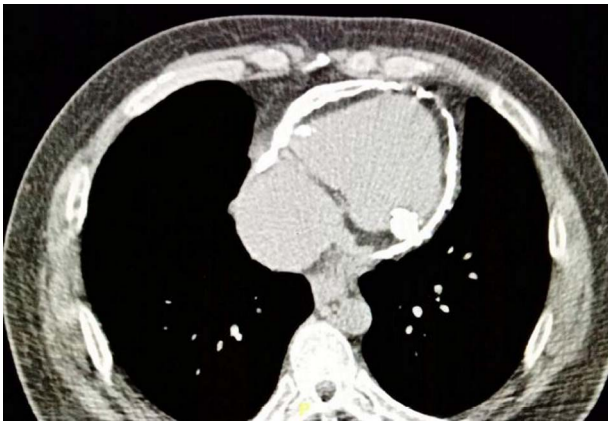


Figure 2: An axial view of CT scan showing PC involving bilateral atria and ventricles.

to develop occasional bilateral leg swelling and abdominal distension. Due to the unresolved symptoms, he sought treatment at a general practitioner and was started on anti-failure medications. Since the symptoms were not fully resolved with oral medications, he was referred to a cardiologist for further evaluation. From the imaging studies (Figs 1 and 2), he was noted to have a calcified pericardium, hence a constrictive pericarditis with calcified pericardium was diagnosed. Electrocardiogram at diagnosis revealed a sinus rhythm with T inversion at lead II, III, aVF and V2–V6 (Fig. 3). ECHO revealed an ejection fraction of 68% with mild MR and TR. There was no diastolic dysfunction. Cardiac angiogram subsequently was normal with no LAD bridging.

He was later counselled to our cardiothoracic unit, where a decision to perform a pericardiectomy was taken. Through this procedure, it aimed to remove part of the calcified pericardium in order to release the heart from the confined space of calcified pericardium. The surgery was performed via open median sternotomy to approach his calcified pericardium (Fig. 4A). An off-pump anterior pericardiectomy which is phrenic to phrenic pericardial stripping was performed (Fig. 4B). Histopathological examination showed a thickened fibrocartilagenous tissue of the pericardium with no inflammation or granuloma formation. Post-operatively, he developed wound dehiscence which

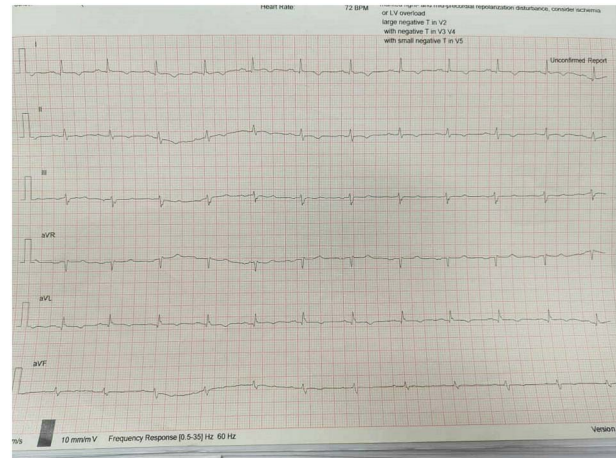


Figure 3: Electrocardiogram revealed sinus rhythm with T inversion at leads II, III, aVF and V2–V6.

was later closed by secondary suturing. Otherwise, he made an uneventful recovery.

DISCUSSION

Calcified pericardium normally indicates the chronicity of constrictive pericarditis. It is important to treat patients with this condition as it will cause cardiac diastolic dysfunction that manifest as cardiac failure symptoms [3]. Any patient with shortness of breath, elevated jugular venous pulse, pedal oedema and ascites should be evaluated for constrictive pericarditis [3]. It happens as the heart is being encased by a non-pliable and rigid pericardium secondary to dense adhesion and fibrosis. The PC usually occurs around the right atrium, anterior right ventricle and diaphragmatic surface; however, the atrioventricular groove is the most common site of involvement mainly due to lower pressure and gravitation influence in the pericardium [1].

PC is easily detected from chest radiography or computed tomography by showing a curvilinear calcification that normally forms on the right side of the heart [1]. Transthoracic echocardiography also is able to visualize the presence of calcified pericardium and measures the pericardial thickness. Other features include a small ventricle with deviated septum due to rapid diastolic filling effect [4].

Pericardiectomy is the only option to treat patients with symptoms of constrictive pericarditis which will result in improvement or normalization of the cardiac function in the majority of cases after releasing the restricted heart [5]. The aim of pericardiectomy procedure is to remove the calcified or fibrotic pericardium as much as possible [6]. The presence of calcified pericardium, which invades the myocardium, will increase the technical difficulty in removing the disease pericardium. Pericardiectomy can be achieved via median sternotomy, anterior thoracotomy or left anterolateral thoracotomy approaches [7]. The extent of total pericardiectomy is usually performed between two phrenic nerves and from the great vessels to the basal aspect of the heart. However, the long-term survival of patients undergoing pericardiectomy is dependent on the aetiology of disease that leads to the constrictive pericarditis.

In conclusion, as in our patient, the history of blunt chest trauma might be the contributing factor to his current illness that required him to undergo pericardiectomy. He showed good

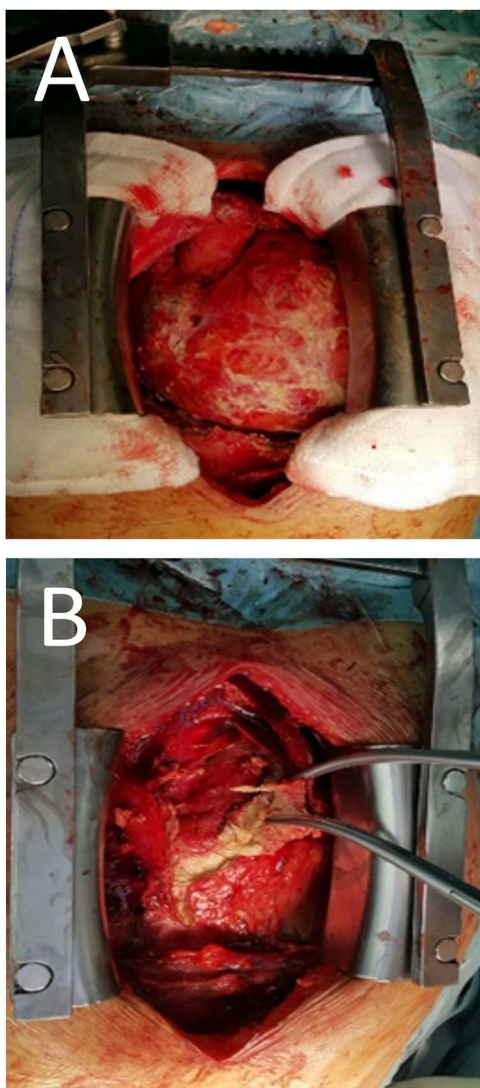


Figure 4: (A) Open median sternotomy revealing a whitish, hardened calcified pericardium suggestive of PC. (B) Anterior pericardiectomy in which phrenic to phrenic pericardial stripping was performed.

progress following his surgery as reported in others series of patients undergoing the pericardiectomy procedure.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interests to declare.

FUNDING

The study did not receive any funding.

ETHICAL APPROVAL

No ethical approval was required for this report.

CONSENT

Written informed consent was obtained from the patient. A copy of the written consent is available for review by the editor of this journal.

GUARANTOR

Firdaus Hayati.

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