Successful salvage of post-traumatic metallic foreign body partially retained in the posterior papillary muscle of the left ventricle

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Received 1 January 2006; received in revised form 8 March 2006; accepted 10 March 2006

Abstract

We report a rare case of a 40-year-old man who had suffered from a metallic foreign body which had punctured from the anterior chest wall into the left ventricle caused by trauma without cardiac tamponade. Surgery was performed. Based on the operation findings, the foreign body was diagnosed as a metallic rusted object partially retained in the posterior papillary muscle. It is very rare particularly for its location, penetrating route of injury and without any symptoms.

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Keywords: Foreign body; Posterior papillary muscle

1. Introduction

Foreign bodies in the heart are often caused by posttraumatic and iatrogenic reasons, which can be retained in different locations of the heart. However, it is very rare without cardiac tamponade, when a metallic foreign body is partially retained in the posterior papillary muscle which had punctured from the anterior chest wall into the left ventricle caused by trauma. Since this foreign body may dislocate with blood flow and is associated with such severe related complications, it is generally removed surgically in emergency. Along with a brief review of the literature, we herein present the case of a patient who underwent surgery after a metallic foreign body, partially retained in the posterior papillary muscle, was identified by echocardiography and computed tomography.

While a 40-year-old male patient was working, a metal foreign body punctured his left anterior chest wall. He felt chest pain for just a very short time. As a left ventricular metallic foreign body was suspected on echocardiography and computed tomography, he was admitted into the hospital one day later. A physical examination on admission revealed no abnormalities of blood pressure, heart sounds, respiratory sounds or neurological findings, just a 0.5-cm wound on the fourth intercostal space of the left anterior chest wall; his height was 169 cm, weight 52.5 kg. In terms of laboratory findings on admission, general hematological and biochemical tests showed no abnormalities, Electrocardiography showed sinus rhythm, heart rate of 61 bpm, with no ST-T changes evident. Chest X-rays demonstrated a sign of metal in the left side of the chest located in the posterior part of the heart, just parallel to the anterior thoracic vertebra. Surface echocardiography identified a foreign body with strong echo of about 0.5 cm in length, located between the posterior papillary muscle and the posterior wall of the left ventricle. This showed that the foreign body was partially attached to the posterior papillary muscle (Fig. 1), but with no blood effusion in the pericardial cavity. Chest computed tomography demonstrated a high-density foreign body in the posterior part of the left ventricular muscle, approximately 1.2 cm from the epicardium.

Based on the above history and findings, the patient was diagnosed with a left ventricular metal foreign body, and was referred to undergo emergency surgery. On December 2, 2005, after a median sternotomy, we found a wound on the left mediastinal pleura and the left ventricle of approximately 1 cm distance from the left anterior descending branch of the coronary artery (both 0.5 cm). The pericardial cavity had no blood effusion. Extracorporeal circulation was initiated between the ascending aorta and the superior vena cava, the inferior vena cava. Under cardiac arrest, an incision was made in the right atrium and atrial septum in order to examine the mitral valve and the left ventricle. With a careful search, we observed a covert metal foreign body partially retained in the posterior papillary muscle, at the corner between the posterior papillary muscle and the posterior wall of the left ventricle. The patient was submitted to extract the foreign body. The mitral valve had no regurgitation. The surgery was successful. Extracorporeal circulation was maintained for 48 min and the duration of aortic clamping was 34 min. The foreign body was a piece of rusted iron, 0.5 cm in length (Fig. 2).

The post-operative course was uneventful, with blood tests and chest X-rays showing normal results. The patient was discharged on the 6th post-operative day. At follow-up, the patient was well.
Fig. 1. (A) Plain chest roentgenogram shows a high density foreign body in the heart. (B) Transthoracic echocardiogram shows a metal foreign body retained in the posterior papillary muscle near the back wall of the left ventricle. (LA = left atrium; LV = left ventricle; AO = aorta; RV = right ventricle; PPM = posterior papillary muscle.)

2. Discussion

A metallic object as a source of thoracic foreign body is common in the Asian community because of trauma. The most common site is the chest wall and lung. However, it is very rare in the posterior papillary muscle near the back wall of the left ventricle, sequentially from the left chest wall, thoracic cavity, pericardium, left ventricular myocardium without cardiac tamponade, pneumothorax or bleeding. We strongly agree with the recommendations of LeMaire and colleagues regarding the medical management of patients with foreign bodies: ‘if a foreign body is small and smooth, if the risk of contamination is minimal and if the symptoms are absent there is no indication to remove it’ [1,2]. For this patient, the foreign body with rust and partially retained in the posterior papillary muscle near the back wall of the left ventricle may have dislocated with blood flow and is associated with such severe related complications. It is essential that it be removed in emergency surgery.

Cardiac tamponade should be observed in a patient with penetrating wound of a foreign body in the heart. If it happens, pericardiotomy must resolutely be taken, not pericardial puncture. The patient without cardiac tamponade can continue to observe, and make diagnosis [2]. For a patient with the foreign body in the left chamber of the heart, especially with a diameter of <3 mm, it is better to take earlier surgery to avoid infarction of organs. It is important to determine the exact location of the foreign body before the operation so as to choose the more appropriate surgical strategy. Chest roentgenography is primarily easy and useful for showing the foreign body. At the present time transthoracic echocardiography and a computed tomographic scan are mandatory to have a correct diagnosis and an exact localization of the foreign body. We believe that intraoperative echocardiography can be helpful during the surgical removal.

We illustrate a very rare and interesting case of a metallic foreign body partially retained in the posterior papillary muscle, particularly for its location, penetrating route of injury and without any symptoms.

References