Brief Communication - Cardiac general

Resection of left ventricular papillary fibroelastoma through thoracoscopic-assisted minithoracotomy

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Abstract

Although a mobile papillary fibroelastoma in the left ventricle should be excised to prevent systemic embolism, difficulties in surgical exposure of a left ventricular mass are not uncommon. Herein, we report a minimally invasive approach for resecting left ventricular papillary fibroelastoma using thoracoscopic assistance.

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1. Introduction

Papillary fibroelastoma (PFE) is a rare primary cardiac tumor usually arising on the left side of the heart [1]. Since the advent of echocardiography, the incidence of asymptomatic PFE has increased. As a mobile PFE in the left ventricle (LV) can cause a lethal systemic embolism, resection of the mass is generally recommended [1–5]. Exposure and removal of PFEs located deep in the LV may be facilitated by video-assisted surgery [3]. We present a case of LV PFE resected by a minimally invasive cardiac surgery technique utilizing thoracoscopic assistance.

2. Case report

A 39-year-old asymptomatic man was referred to our hospital for the surgical treatment of an LV mass. He had been medicated for hypertension and mild hypertropic cardiomyopathy for five years. His physical and neurological examinations were unremarkable. Transesophageal echocardiography and a chest CT scan, however, showed a mobile, 1.3-cm-sized round mass attached to the medial side of the anterolateral papillary muscle of the LV (Fig. 1). As we had performed minimally-invasive mitral valve surgery on more than 300 patients and the small mass was located near the papillary muscle of the LV, we decided to perform surgery using a minithoracotomy approach instead of median sternotomy.

Surgery was performed through a 5-cm right anterior thoracotomy using voice-activated robotic camera control (AESOP 3000). For minimally invasive video-assisted LV mass resection, the right femoral artery (17Fr, Medtronic, Inc., Minneapolis, MN), femoral vein (21Fr) and right internal jugular vein (21Fr) were cannulated. Under peripheral cardiopulmonary bypass, transthoracic aortic clamp (Chitwood clamp) and antegrade cardioplegic arrest, the left atrium was opened along the interatrial groove. After simple anterior retraction of the interatrial septum with Chitwood hand-held left atrial retractor, the mitral valve was easily visible. Then an endoscopic-lung retractor for additional retraction of the anterior mitral leaflet provided excellent exposure of the left ventricular mass (Fig. 2). A 1.5 x 1.0-cm-sized mass was easily excised along with the adjacent papillary muscle, and histological examination showed that it was a papillary fibroelastoma with clear margins (Video 1). It took 57 min for the cardiopulmonary bypass and 24 min for the aortic cross clamping. The patient had an uneventful recovery. A transthoracic echocardiogram showed no evidence of residual mass or mitral valve abnormality.

3. Discussion

PFE is a rare benign cardiac tumor occurring mostly on the valvular endocardium (over 80%), with the LV being the predominant site of nonvalvular development [1]. Due to its propensity towards distal embolization, complete surgical resection has been recommended for a mobile mass [1,5]. In particular, PFE located on the LV papillary muscle should be removed, because these tumors have a greater tendency to cause systemic embolism than those located at other sites [2].

LV PFEs have been removed through the left atrium and/or the aorta after median sternotomy. When a tumor is located comparatively deep inside the LV, however, it may be difficult to expose through either the mitral or aortic valve, and therefore may require an additional left ventriculotomy [6,7]. The latter and exposure-related
valvular damage can be avoided by using various video-assisted surgical techniques, including rigid and flexible cardioscopes [3, 4]. To date, the most of video-assisted LV PFEs excision have been performed through standard sternotomy to prepare the potential left ventriculotomy. However, sternotomy may not be the best option in all cases, as it usually results in limited exposure of the LV tumor, especially when it is performed via transmural approach in patients with a relatively small left atrium. In contrast, using right thoracotomy may provide a perpendicular optical axis to mitral annulus, as well as appropriate exposure of the mitral subvalvular apparatus and LV cavity without extensive retraction of the interatrial septum. However, since neither the transaortic nor transventricular approach can be used under minithoracotomy, careful preoperative examination of the shape, characteristics, and locations of the mass is essential when planning excision of a left ventricular PFE by minithoracotomy.

In conclusion, we present a case of PFE on the deep inside of the left ventricle, which was resected using a thoraco-scopically assisted minimally invasive approach. These findings suggest that, in selected cases, LV masses can be safely resected using this technique.

References