Papillary fibroelastomas (PFEs) are rare primary benign cardiac tumors. They are the third most frequent cardiac neoplasm and commonly arise from valvular lesions. Only 9% of PFEs are detected in the left ventricle, mostly in the left ventricular outflow tract or papillary muscles. In contrast, PFE in the left ventricular apex is a very rare finding.

Case Report

An 81-year-old woman with nonspecific systemic symptoms underwent preoperative assessment with echocardiography in anticipation of surgery to address uterine prolapse. A 1.3-cm round mobile mass was noted in the left ventricular apex (Fig. 1). Subsequent computed tomography (CT) imaging also showed a mass in the left ventricular apex (Fig. 2). Although left ventricular function was normal, the patient was treated with warfarin anticoagulation therapy for 2 weeks in the event that the finding represented a thrombus. However, this regimen did not result in any changes in the size of the mass. To prevent systemic embolization, the patient underwent excision of the tumor.

Surgery was performed via a midline sternotomy. A 5-mm trocar was inserted through the right fourth intercostal space at the anterior axillar line to allow close visualization of the tumor with a videoscope (Fig. 3). Cardiopulmonary bypass was established in a standard manner with aortic and bicaval cannulation. On cardiopulmonary bypass with aortic clamping and antegrade cardioplegic arrest, the left atrium was opened along the interatrial groove.

The tumor was present in a deep area between the anterior and posterior papillary muscles, and was noted to arise from one of the thin false tendons in the left ventricular apex. Although most of the tumor could be directly visualized through the mitral valve by slightly pushing the apex upward, assessment via the videoscope

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Fig. 1 Transthoracic apical four-chamber view showing a small hyperechoic mass attached to the apex of the left ventricle.

Fig. 2 Chest computed tomography (CT) showing a left ventricular mass in the apex.

Fig. 3 A 5-mm trocar is inserted through the right fourth intercostal space at the anterior axillar line. The oblique computed tomography (CT) image of fourth intercostal/apical plane shows that the change in direction of the long axis of the mitral valve/apical tumor caused by the mitral retractors and dropped apex in the cardiac arrest phase resulted in a suitable straight line to the apex for the videoscope.
provided much more information regarding the location and margin of the tumor in the left ventricle.

The mass was easily excised under direct visualization by cutting off the attached tendon (Fig. 4a). The patient had an uneventful recovery.

Histological examination revealed that the tumor was a papillary fibroelastoma arising from a miniature tendinous structure. The fronds were composed of avascular, sparsely cellular connective tissue lined by a single layer of hyperplastic endothelial cells. The layer of elastic fibers is a hallmark of this tumor (Fig. 4b–4d).

Discussion

PFE is a rare benign cardiac tumor, and localization of this type of neoplasm in the apex of the left ventricle is extremely rare. PFE can be incidentally detected during routine echocardiography, cardiac surgery, or autopsy.

At echocardiography, PFEs appear as mobile, pedunculated or sessile, endocardial echo-dense masses. They may also appear as speckled, with a stippled pattern near the edges, which correlates with papillary projections on the surface of the tumor. Sun, et al. reported that transthoracic echocardiography had a sensitivity and specificity of 88.9% and 87.8%, respectively, for detection of PFEs. Common locations of PFEs are different from those of other cardiac tumors. However, in this case, these characteristics were not detected.

Although the management of fibroelastoma is controversial, surgical excision is necessary, even in asymptomatic patients to prevent life-threatening embolization, particularly when the fibroelastoma is mobile and/or its diameter is equal to or greater than 1 cm. The patient in this report was asymptomatic, but the lesion was 1.3 cm in diameter and mobile. In addition, the mass was attached to the left ventricle through a thin tendinous chord. Therefore, surgical excision was indicated.

Histological examination revealed that the PFE arose from a miniature tendinous structure. This finding may provide the basis for the hamartoma hypothesis of PFE.

The other challenge in this case was the surgical approach to the tumor. We performed excision via the mitral valve.
to avoid the potential complications associated with left ventriculotomy. Several reports have described video-assisted excisions of fibroelastoma located deep in the left ventricle.\(^7,8\)

It may be possible to directly visualize the tumor via the mitral valve in some cases in which the tumor is located deep in the left ventricle. Thus, the use of a videoscope may not be essential in all cases. However, videoscopy likely enhances the safety of the procedure because the direction of the long axis of the mitral valve/apical tumor often changes in the cardiac arrest phase, particularly when the mitral retractors are attached to left atrial wall (Fig. 3).

To facilitate the characterization of the tumor with a rigid videoscope, a 5-mm trocar was inserted through the right fourth intercostal space at the anterior axillary line. Insertion of a rigid scope directly through a midline sternotomy via right-sided left atriotomy should be avoided because this approach does not provide a natural straight line of sight to the apex for a rigid scope; therefore, it may lead to accidental injury of the cardiac wall (Fig. 3).

In addition, close observation with a videoscope is also useful for the detailed evaluation of a tumor located deep in the left ventricle and may enhance the safety of the procedure by decreasing the risk of embolic complications associated with collapse of the tumor.

Resection of a left ventricular mass may be possible via a right minithoracotomy. However, we performed excision via a midline sternotomy, as this strategy allows prompt removal of the mass through left ventriculotomy if any complications are encountered during the surgery.

No definitive guidelines that address the utility of anticoagulation therapy to prevent thromboembolism in patients with PFEs have been established. We believe that anticoagulation therapy should be utilized preoperatively,\(^9\) particularly in high-risk patients with documented neurological events, due to the risk of tumor-induced thromboembolization. However, anticoagulation might be discontinued postoperatively if complete excision of the PFE is accomplished.

**Conclusion**

In conclusion, this report described a rare case of fibroelastoma arising from a miniature tendinous cord in the apex of the left ventricle. Videoscopy facilitated safe and effective removal of the lesion in this case.

**Disclosure Statement**

None.

**References**