

Multiple papillary fibroelastoma originating from 3 leaflets of the aortic valve



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Disclosures: The authors reported no conflicts of interest.

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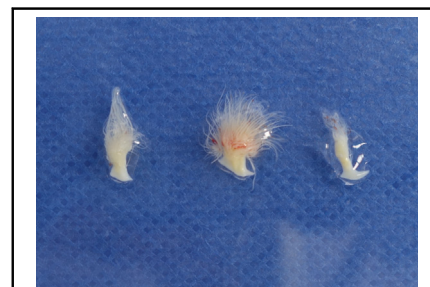
Received for publication Feb 14, 2023; revisions received June 13, 2023; accepted for publication June 21, 2023; available ahead of print July 20, 2023.

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JTCVS Techniques 2023;21:62-4
2666-2507

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<https://doi.org/10.1016/j.jtc.2023.07.003>



PFE originating from the 3 leaflets of the aortic valve.

CENTRAL MESSAGE

We report the successful surgical removal of a PFE originating from 3 leaflets of the aortic valve.

Video clip is available online.

Cardiac papillary fibroelastoma (PFE) is a rare, but not uncommon, benign cardiac tumor that occurs mainly on the valvular endocardium. We report an extremely rare case of an 81-year-old woman who underwent surgical removal of 3 masses arising simultaneously from each leaflet of the aortic valve that were confirmed as cardiac PFEs. Ethics review is not required for case report implementation at our institution. Written informed consent for publication was signed by the patient.

CASE REPORT

An 81-year-old woman was referred to our department for surgical intervention of aortic valve attached mass, discovered incidentally during the preoperative assessment for cataract surgery. The most recent echocardiography checkup revealed a mass, increasing in size during the last 3 months, suspicious of a cardiac tumor.

Preoperative transthoracic echocardiography showed no aortic stenosis, trace aortic insufficiency, and a relatively luminous cordiform, mobile tumor of 15 mm on the left coronary leaflet toward the sinus of Valsalva (Figure 1, A). Attachment of a relatively high luminosity structure was suspected on the right coronary leaflet and noncoronary leaflet as well. No obvious anomalous structures were

observed adhering to the mitral, tricuspid, or pulmonary valves. Other than the imaging tests, the patient showed no abnormal physical findings or laboratory data.

Although asymptomatic, the patient was scheduled for surgery to prevent embolism. The surgery was performed through a median sternotomy. We initiated cardiopulmonary bypass with ascending aortic cannulation and bicaval venous drainage. Upon transverse aortotomy, observation of the aortic valve revealed a stalked joint mass at the Arantius body of the noncoronary leaflet, right coronary leaflet, and left coronary leaflet (Figure 1, B1-B3, and Video 1). The apex of each mass was covered with fine hair-like fibers, visually reminiscent of a "sea anemone." Each mass was removed without injuring the aortic valve leaflet. The remainder of the aortic valve and sinus of Valsalva appeared grossly normal. The sinus of Valsalva was filled with saline to ensure that there was no obvious regurgitation, and the aortotomy was closed.

The specimens removed were each approximately 10 mm long and were all whitish, stalked papillary lesions (Figure 2, A). Postoperative tumor histopathology (Figure 2, B-D) revealed that the tumors were fibrous connective tissue with branching and eosinophilic unstructured

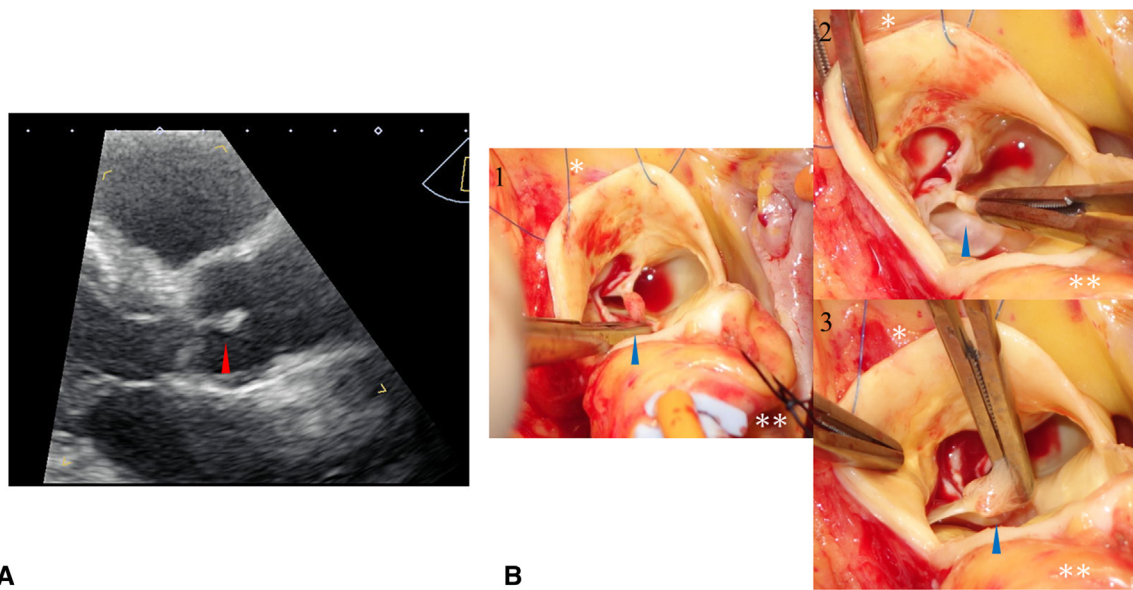


FIGURE 1. A, Preoperative transthoracic echocardiography shows a relatively luminous, cordiform, mobile tumor of 15 mm (red arrowhead) attached to the aortic valve. B, Surgical view through aortotomy demonstrates tumor on each coronary leaflet (blue arrowhead). 1: NCL, 2: RCL, 3: LCL. *Caudal side. **Cranial side. NCL, Noncoronary leaflet; RCL, right coronary leaflet; LCL, left coronary leaflet.

deposits, covered by a single layer of squamous epithelium, which is compatible with cardiac PFE.

The patient's postoperative course was uneventful, and postoperative echocardiography revealed favorable results without evidence of any residual tumor on the aortic valve and aortic insufficiency. The patient was discharged 12 days after surgery. The 1-year postoperative follow-up was uneventful, and we are now carefully monitoring the progress.

DISCUSSION

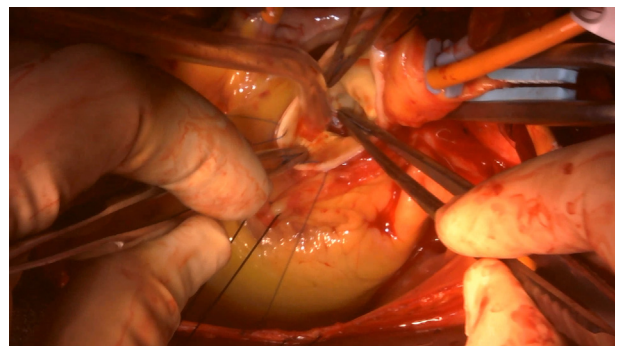
PFE is a rare benign cardiac tumor. However, with the development of imaging techniques such as echocardiography, incidental discovery in previously asymptomatic patients is very likely.¹ Cardiac PFE occurs most commonly on the cardiac valves (78%) and is predominantly located on the aortic valve. Although most PFEs are solitary, according to the Mayo Clinic series, 21% of resected cases were reported to be multiple (range, 2-40).² However, multiple lesions in the same valve are extremely rare, and few cases have been reported.³ In the present case, we report a patient who had 3 masses arising simultaneously from each leaflet of aortic valve, which were then confirmed as cardiac PFEs. Each tumor was removed by direct excision, preserving the native aortic valve.

There are several hypotheses about the cause of PFE formation, but none have been scientifically proven. Whether they are reactive growths, hamartomatous processes, or neoplastic lesions remains unknown. However, their propensity to develop on damaged endocardial surfaces seems to support the notion that they are reactive growths.⁴ Given

that PFE occurs at the contact surfaces of the 3 leaflets, reactive growth may be a possible cause due to continuous endothelial damage on valvular surfaces.

CONCLUSIONS

In patients with echocardiographically suspected PFE who do not undergo surgical removal, the rates of cerebrovascular accident and mortality are thought to be increased;² therefore, operative indication was considered reasonable for this asymptomatic elderly woman. For multiple lesions surgery, Touati and colleagues³ warned of the existence of unresected "hidden tumors," and although the



VIDEO 1. Head camera video from left side of patient; PFEs attaching to NCL, RCL, and LCL, in sequence. PFE, Papillary fibroelastoma; NCL, noncoronary leaflet; RCL, right coronary leaflet; LCL, left coronary leaflet. Video available at: [https://www.jtcvs.org/article/S2666-2507\(23\)00218-3/fulltext](https://www.jtcvs.org/article/S2666-2507(23)00218-3/fulltext).

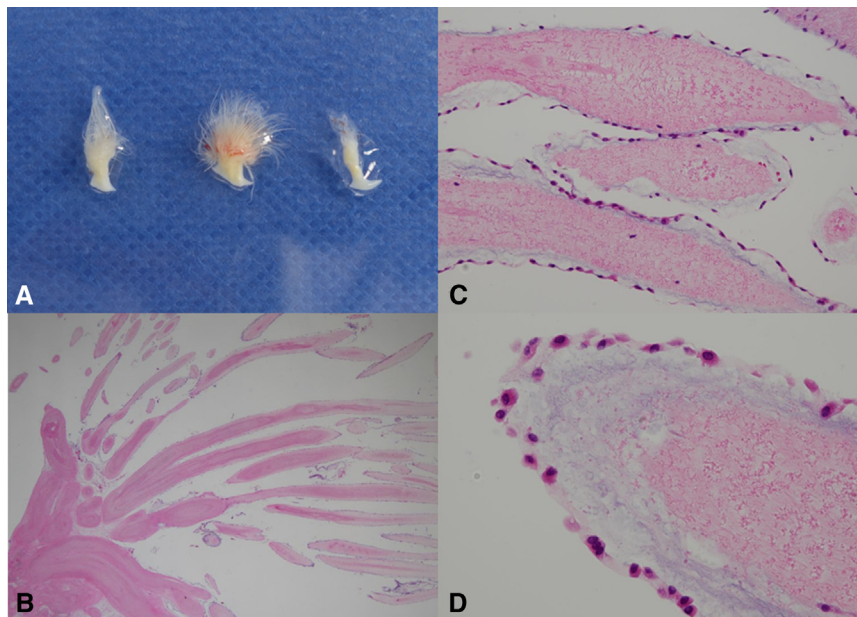


FIGURE 2. A, Macroscopic image of the tumor, characteristic gelatinous appearance of papillary fibroelastoma, looked like “sea anemone” shape. B-D, Hematoxylin–eosin stains of the tumor. B, $\times 20$; Histologically, the tumor consists of narrow papillary fronds showing complex branching patterns (C) $\times 200$, (D) $\times 400$; avascular fibroelastic tissue lined by a single layer of endocardium.

Mayo Clinic series reported 1.6% recurrence after the tumor removal,² the most recent data from the Mayo Clinic showed that 12% had a recurrence of PFE, with the first occurrence being an aortic valve.⁵ Needless to say, continued follow-up is necessary for this benign tumor. Furthermore, it may be necessary to reconsider surgical strategies for similar cases in the future.

The authors thank Dr Laura Yuriko González Teshima, Department of Cardiovascular Surgery, Graduate School of Medicine, Kyoto University, for critical reading.

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