Journal of Cardiothoracic Surgery

CASE REPORT

Open Access

Cardiac papillary fibroelastoma in an unusual left atrial location in combination with mediastinal thymic cyst: a case report

Sameh Alagha[1*], Levent Özdemir[2], Elif Tuncel[3] and Hasan Ekim[1]

Abstract

Background Cardiac papillary fibroelastomas are rare, benign endocardial tumors most commonly found on cardiac valves. Non-valvular locations, particularly the posterior left atrial wall, are exceptionally uncommon. Thymic cysts are also rare lesions. The presence of these two non-homologous tumors in a single patient has not been previously documented.

Case presentation This report presents a case of cardiac papillary fibroelastoma located on the posterior left atrial wall coexisting with a thymic cyst in the anterior mediastinum, both of which were incidentally detected and surgically treated.

Conclusion This is the first reported case of a cardiac papillary fibroelastoma arising from the posterior left atrial wall coexisting with a thymic cyst. Despite their benign nature, such lesions carry potential clinical risks. Their simultaneous detection and successful surgical management highlight the value of comprehensive imaging and multidisciplinary care.

Keywords Cardiac papillary fibroelastoma, Thymic cyst, Left atrium

Background

Cardiac papillary fibroelastomas (CPFs) are benign tumors originating from the endocardium and generally affect the valvular endocardium [1]. Based on previous large autopsy case studies, cardiac myxomas were thought to be the most common benign cardiac primary neoplasm. However, the widespread use of echocardiography has led to the view that CPF may be the most common benign primary cardiac neoplasm [2].

Most patients with papillary fibroelastomas are asymptomatic and are usually detected incidentally during routine echocardiographic examinations or at autopsy [3]. However, these tumors have the potential to lead to serious thromboembolic complications, cerebrovascular accidents, myocardial infarctions, syncope, and pulmonary and peripheral embolisms, regardless of their size [4–7].

Mediastinal thymic cysts, which are generally asymptomatic, are broadly classified into congenital and inflammatory types, with histopathological categorization into unilocular and multilocular groups. The majority are benign, but malignant cysts may cause compression

*Correspondence:
Sameh Alagha
samehalagha@gmail.com
[1]Department of Cardiovascular Surgery, Yozgat Bozok University School of Medicine, Yozgat, Turkey
[2]Department of Cardiology, Yozgat Bozok University School of Medicine, Yozgat, Turkey
[3]Department of Pathology, Yozgat City Hospital, Yozgat, Turkey

© The Author(s) 2026. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

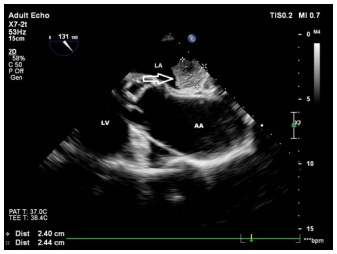


Fig. 1 TEE image demonstrating a mobile mass (white arrow) attached to the posterior left atrial wall (white arrow). (LA) left atrium, (AA) ascending aorta, (LV) left ventricle

symptoms. Therefore, symptomatic thymic cysts should be treated surgically [8].

In this report, we present a unique case diagnosed with CPF located on the posterior surface of the left atrium, coexisting with a thymic cyst.

Case presentation

A 75-year-old male patient was scheduled for total knee arthroplasty surgery in our hospital due to osteoarthritis in November 2024. After routine laboratory and imaging studies for orthopedic surgery, the patient was referred to the cardiology department for preoperative evaluation. The electrocardiogram showed a normal sinus rhythm. A two-dimensional transthoracic echocardiogram (TTE) showed a left ventricular ejection fraction of 65% and a 40mmx25mm mobile mass attached to the posterior wall of the left atrium. No masses were observed in other cardiac chambers. A transesophageal echocardiography (TEE) was performed to differentiate thrombus from an intracardiac mass. The TEE revealed a 25 × 28 mm solid mass with a wide base originating from the posterior wall in the left atrium and another related mobile mass (Fig. 1). The mass was considered an atrial myxoma. No significant lesion was detected in the patient's coronary angiography. A decision was made for surgical resection due to embolization risk. On the preoperative posterior-anterior (PA) chest radiograph, a spherical 2 cm diameter mass near the aortic knob was noted (Fig. 2A).

The operation was performed through a median sternotomy incision. A mass of approximately 2 cm in diameter, filled with a milky white fluid and attached to the pericardium, was explored and resected. Cardiopulmonary bypass with aorto-bicaval cannulation was established. After cardiac arrest, A standard left atriotomy incision was performed by dissecting Sondergaard's groove, and a mass with a myxoid appearance and papillary protrusions was found attached to the left atrial posterior wall near the right upper pulmonary vein. The mass was completely resected, and the resulting defect in the atrial wall was repaired using a 4.0 prolene suture. The left atrium incision was closed, and weaning off the pump was achieved. The postoperative period was uneventful. Postoperative TTE indicated no residual left atrial mass and the postoperative PA chest radiograph showed that the mass near the aortic knob had disappeared (Fig. 2B).

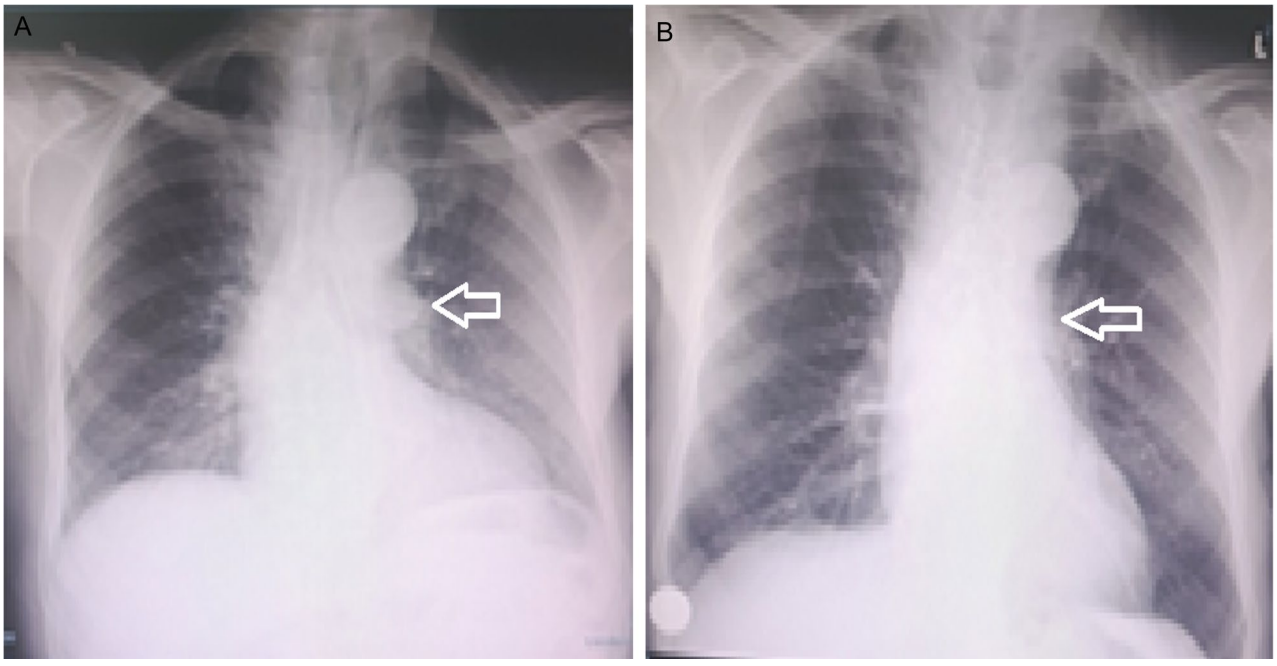


Fig. 2 (**A**) Preoperative chest radiograph showing a spherical mediastinal mass near the aortic knob (white arrow). (**B**) Postoperative chest radiograph demonstrating complete resolution of the mediastinal mass after surgical excision of the thymic cyst (white arrow)

Histopathological evaluation

The histopathological examination of the tumoral mass excised from the left atrium revealed a benign tumoral development. The tumor was characterized by a surface lined with a single layer of flattened epithelium, a fibrotic stroma, and branching papillary structures. While some areas exhibit a more myxoid and cellular appearance, no significant atypia was observed, leading to a diagnosis of papillary fibroelastoma (Fig. 3A). The diagnosis was confirmed by the presence of CD31-positive endothelial cells lining the surface of the papillary fibrotic structures, and the possibility of a myxoma was excluded due to the negative Calretinin staining (Fig. 3B).

The histopathological examination of the mediastinal mass revealed thymic tissue with atrophic features, predominantly composed of adipose tissue and exhibiting hypocellular characteristics (Fig. 4A). Hassall's corpuscles were occasionally identifiable within the tissue. The specimen demonstrated unilocular cystic development, lined by a single or double layer of epithelium in broad areas (Fig. 4B). This was confirmed as residual thymic tissue through the presence of CD3-positive T lymphocytes (Fig. 4C) and p63-positive Hassall's corpuscles (Fig. 4D). Furthermore, widespread p63 positivity in the cyst epithelium supports the diagnosis of unilocular thymic cyst.

Discussion and conclusion

CPFs are rare but clinically significant benign tumors of the endocardium, most commonly arising from valvular surfaces [2]. While they typically arise from the aortic or mitral valves, CPFs can also occur on non-valvular surfaces [3, 4]. Thymic cysts, likewise, account for a small proportion of anterior mediastinal masses and are typically asymptomatic, often discovered incidentally during imaging or surgery [9]. To our knowledge, the simultaneous occurrence of a CPF and a thymic cyst in the same patient has not been previously described. The etiology of CPFs remains uncertain, with multiple hypotheses proposed. Endothelial damage, organized thrombus formation, hamartomatous proliferation, and inflammatory or iatrogenic factors have all been implicated. Histological studies frequently demonstrate fibrin, hyaluronic acid, and laminated elastic fibers within the tumor matrix, supporting the theory that CPFs may arise from thrombus organization [10]. Some cases have shown an association with prior thoracic radiation or cardiac surgery, suggesting delayed neoplastic transformation due to endothelial injury [11].

While CPFs most often arise from valvular surfaces, especially the aortic (44%) and mitral (35%) valves, they have been observed in extravalvular regions such as the left atrium, interatrial septum, and ventricular walls at markedly lower frequencies [12–14]. Left atrial wall involvement is particularly rare, reported in only 0.013% of CPFs in large series [12].

Although the endocardial surfaces of valves are most exposed to cyclic shear and microtrauma, current pathological understanding suggests several mechanisms may explain the occurrence of non-valvular CPFs: the organized thrombus hypothesis proposes that repetitive endothelial injury promotes deposition and subsequent organization of fibrin and mucopolysaccharides, leading

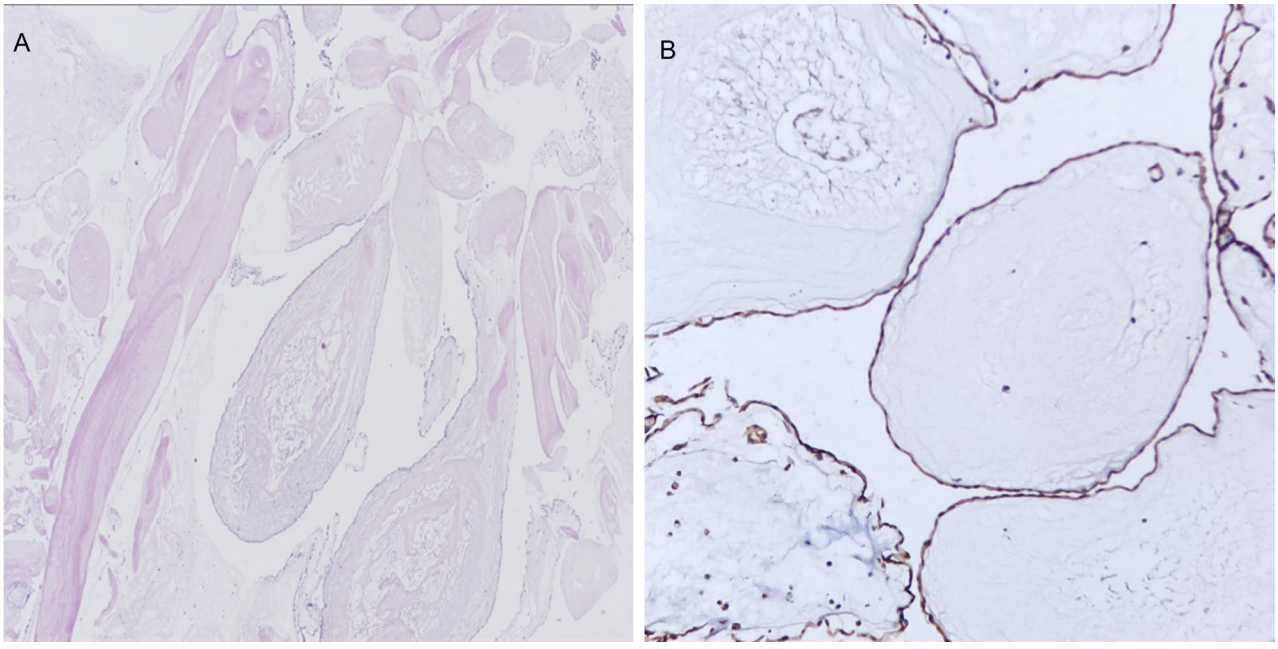


Fig. 3 (**A**) Hypocellular papillary formations, covered by a single layer of flattened epithelium, are observed in the H&E Sect. (2.5x). (**B**) Immunohistochemical staining demonstrates a single layer of flattened epithelium that consists of endothelial cells positive for CD31

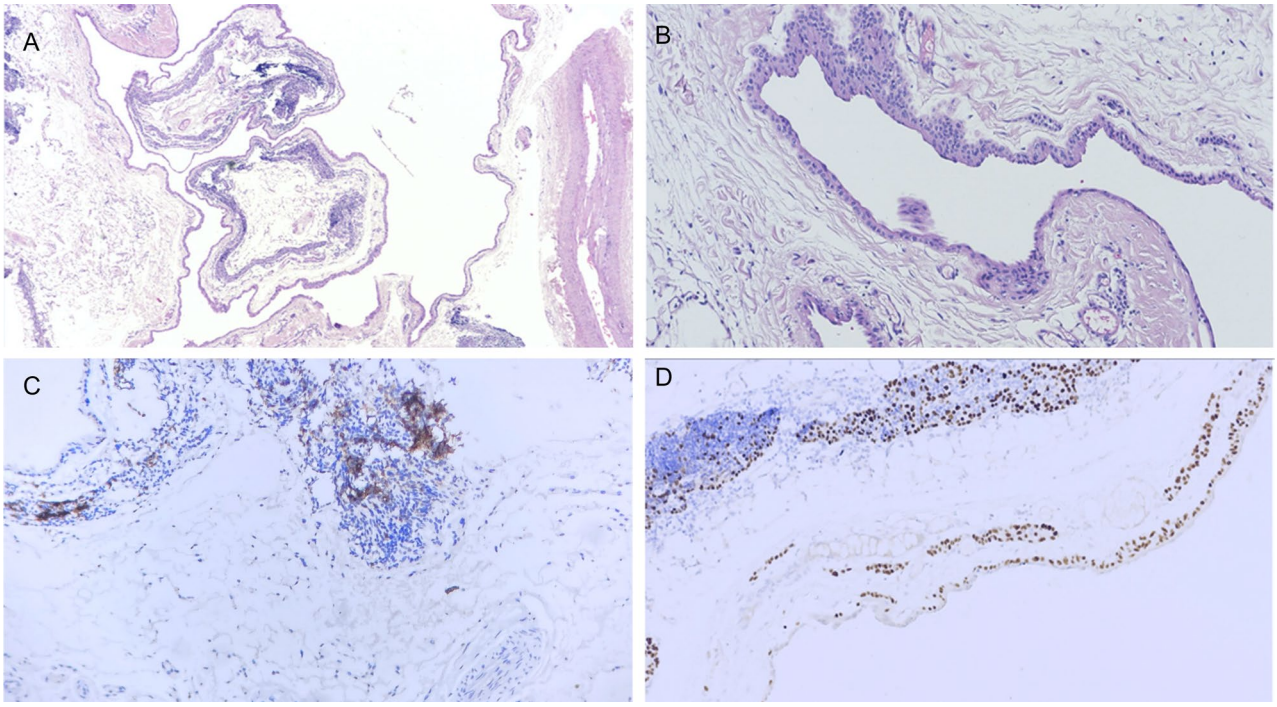


Fig. 4 (**A**) Low magnification view (2.5x) shows unilocular cystic structures located within extensive areas of adipose tissue and residual thymic tissue. (**B**) High magnification view shows multiple layers of epithelial cells lining the cyst. (**C**) Immunohistochemical staining demonstrates CD3-positive T lymphocytes within the residual thymic tissue. (**D**) Immunohistochemical staining demonstrates nuclear p63 expression in both the epithelial lining of the cyst and the epithelial cells of the residual thymic tissue

to the formation of papillary fronds characteristic of CPF [15]. In addition, localized hemodynamic factors outside the valve leaflets can also create focal endothelial stress, as the posterior left atrial wall near the right upper pulmonary vein which is the attachment site in our patient is a region where pulmonary venous inflow meets left atrial vortices, potentially creating turbulent microenvironments and focal endothelial stress that mirror valvular conditions. Moreover, emerging molecular evidence, including reports of KRAS mutations in up to 80% of analyzed lesions, supports the concept that at least a subset of CPFs may represent true neoplasms rather than purely reactive proliferations [16]. No single mechanism fully explains the predilection for non-valvular sites, but the combination of neoplastic and reactive processes, along with local hemodynamic factors and endocardial vulnerability, is most consistent with current clinical and pathological evidence. Nevertheless, many CPFs arise in structurally normal hearts, indicating a multifactorial or idiopathic pathogenesis [17].

Diagnosis of CPFs relies primarily on imaging. TTE is often the first tool used and has good sensitivity for tumors larger than 0.2 cm. However, smaller or atypically located tumors, such as in the atrial wall, may be missed [15]. TEE offers greater resolution and is essential for assessing the morphology and mobility of CPFs and is capable of detecting lesions as small as 5 mm [10]. Cardiac MRI and CT can be used alongside echocardiography to identify anatomical structures, especially in cases of diagnostic uncertainty [2]. However, their utility is often limited by the small size and high mobility of papillary fibroelastomas [18]. In our case, both TTE and TEE were used to identify the mass, although it was initially misdiagnosed as a myxoma due to its atypical left atrial location and morphology. Management of cardiac papillary fibroelastomas is primarily surgical, particularly in cases where the tumor is mobile, symptomatic, left-sided, or larger than 1 cm, due to the substantial risk of embolic events including stroke and myocardial infarction [2, 19–21]. Surgical excision is generally curative, and recurrence of CPFs following complete resection has not been reported in the literature. However, long-term follow-up studies are warranted to better identify the recurrence risk [4]. Complete removal of the tumor along with its stalk and underlying endocardium is essential to prevent intraoperative fragmentation and minimize residual disease. In cases where the tumor is valvular, careful resection is needed to avoid damage to the leaflet, and valve repair or replacement may be necessary if structural integrity is compromised [2, 22]. While there is ongoing debate regarding the treatment of asymptomatic CPFs, especially those that are small and non-mobile, most experts advocate for surgery in left-sided lesions given their high thromboembolic potential. For patients

deemed high risk or inoperable, conservative management with long-term anticoagulation or antiplatelet therapy has been proposed, although the evidence base remains limited [12, 15, 23, 24]. In our case, the surgical approach was favored due to the tumor's large size and its high embolic risk, and complete resection was achieved without postoperative complications.

Thymic cysts account for only 1%–3% of anterior mediastinal masses and are most often congenital and unilocular in adults [8, 9, 25]. Thymic cysts may coexist with thymomas, thymic carcinomas, or other malignant neoplasms, potentially reflecting cystic transformation induced by inflammatory processes [26]. Most thymic cysts are diagnosed in early childhood, making their occurrence in adults uncommon [27] and often present as cervical masses. They can be associated with systemic diseases, including lupus erythematosus, myasthenia gravis and rheumatoid arthritis [28]. Although typically asymptomatic, they may undergo malignant transformation or cause compressive symptoms, particularly when discovered later in life [26, 29].

The concurrent presence of CPF and a thymic cyst in our patient represents a rare clinical scenario. While each of these lesions is uncommon in isolation, their coexistence in the same individual has not been previously documented. To date, there is no evidence of a common developmental, molecular, or immunological mechanism linking CPFs with thymic cysts. In our case, histopathological evaluation demonstrated the characteristic features of CPF, including a CD31-positive endothelial lining and absence of calretinin expression, thereby excluding myxoma, in parallel with a unilocular thymic cyst exhibiting p63-positive epithelial lining and CD3-positive residual thymic tissue. These findings confirm the presence of two distinct lesions without histological overlap. Although a shared predisposition related to age or systemic factors cannot be entirely excluded, the available evidence supports a coincidental association. Nevertheless, A similar combination of unrelated masses, such as left atrial myxoma with pulmonary squamous cell carcinoma and thymic cyst [25] or a concomitant tricuspid valve papillary fibroelastoma and lung cancer [30] has been reported in the literature, highlighting the importance of diagnostic surveillance and comprehensive thoracic imaging when one lesion is found.

In conclusion, this case emphasizes the importance of considering papillary fibroelastoma in the differential diagnosis of left atrial masses. Although histologically benign, CPFs carry a high risk of embolic events, particularly when located on the left side of the heart and surgical resection remains the preferred treatment. The concurrent finding and removal of a thymic cyst further highlights the value of a comprehensive surgical exploration and a multidisciplinary approach.

Acknowledgements
None.

Author contributions
SA and HE drafted the manuscript. SA and HE designed the study. ET prepared Figs. 3 and 4. HE and LÖ revised the manuscript. All authors read and approved the final manuscript.

Funding
All authors declare no financial disclosure.

Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics and consent to participate
The ethical committee in our trust approves of the publication of this case report.

Consent for publication
Written informed consent was obtained from the patient for publication of this article and any accompanying images.

Competing interests
The authors declare no competing interests.

Received: 2 August 2025 / Accepted: 24 January 2026
Published online: 01 April 2026

References

1. Kuralay E. Triküspid Kapak Yerlesimli papiller fibroelastoma. Turk J Thorac Cardiovasc Surg. 2015;23:137–9.
2. Zoltowska DM, Sadic E, Becoats K, et al. Cardiac papillary fibroelastoma. J Geriatric Cardiol. 2021;18:346–51.
3. Matsumoto N, Sato Y, Kusama J, et al. Multiple papillary fibroelastomas of the aortic valve: case report. Int J Cardiol. 2007. https://doi.org/10.1016/j.ijcard.2006.11.026.
4. Öz K, Aktürk IF, Ulukan M, özer, et al. An unusual presentation of a cardiac papillary fibroelastoma: A case report. Turkish J Thorac Cardiovasc Surg. 2014;22:826–9.
5. Lin Y, Wu W, Gao L, et al. Multimodality imaging of benign primary cardiac tumor. Diagnostics. 2022. https://doi.org/10.3390/diagnostics12102543.
6. Karigyo CJT, Pessoa BMS, Nicacio SP, et al. Cardiac tumors: review. Braz J Cardiovasc Surg. 2024. https://doi.org/10.21470/1678-9741-2023-0405.
7. Barbarossa A, Coraducci F, Cipolletta L, Federico Guerra ADR. Very mobile left ventricular outflow tract papillary fibroelastoma presenting with multiple ischemic strokes: A case report and brief review of the literature. J Cardiovasc Echogr. 2022;32:222–4.
8. Cooley-Rieders K, Van Haren RM. Mediastinal thymic cysts: a narrative review. Mediastinum. 2022;6:33.
9. Vargas D, Suby-Long T, Restrepo CS. Cystic lesions of the mediastinum. Semin Ultrasound CT MRI. 2016;37:212–22.
10. Klarich KW, Enriquez-Sarano M, Gura GM, et al. Papillary fibroelastoma: echocardiographic characteristics for diagnosis and pathologic correlation. J Am Coll Cardiol. 1997;30:784–90.
11. Kurup AN, Tazelaar HD, Edwards WD, et al. Iatrogenic cardiac papillary fibroelastoma: a study of 12 cases (1990 to 2000). Hum Pathol. 2002;33:1165–9.
12. Gowda RM, Khan IA, Nair CK, et al. Cardiac papillary fibroelastoma: a comprehensive analysis of 725 cases. Am Heart J. 2003;146:404–10. https://doi.org/10.1016/S0002-8703(03)00249-7.
13. Stiru O, Geana RC, Dragulescu PR, et al. Transapical left ventricular approach for cardiac papillary fibroelastomas: a case report. In Vivo. 2020;34:3681–5. https://doi.org/10.21873/INVIVO.12216.
14. Siddiqui A, Rehman S. Cardiac papillary fibroelastoma: a rare cause of cardioembolic stroke. Neurol India. 2022;70:380–3. https://doi.org/10.4103/0028-3886.338649.
15. Sun JP, Asher CR, Yang XS, et al. Clinical and echocardiographic characteristics of papillary fibroelastomas: a retrospective and prospective study in 162

patients. Circulation. 2001;103:2687–93. https://doi.org/10.1161/01.CIR.103.22.2687.
16. Wittersheim M, Heydt C, Hoffmann F, Büttner R. KRAS mutation in papillary fibroelastoma: a true cardiac neoplasm? J Pathology: Clin Res. 2017;3:100–4. https://doi.org/10.1002/cjp2.66.
17. Kurian KC, Edwards FH, Jacob B, et al. Papillary fibroelastoma presenting as left ventricular mass: current update and literature review. Tex Heart Inst J. 2006;33:63–5.
18. Kim A, Kim JS, Yoon Y, Kim EJ. Multidetector computed tomography findings of a papillary fibroelastoma of the aortic valve: a case report. J Korean Med Sci. 2010;25:809–12. https://doi.org/10.3346/JKMS.2010.25.5.809.
19. Vivacqua A, Shafii A, Kalahasti V, et al. Left Ventricular Outflow Tract Papillary Fibroelastoma Presenting With Non-ST-Segment Elevation Myocardial Infarction. J Am Coll Cardiol. 2010;55:2607. https://doi.org/10.1016/j.jacc.2009.07.080.
20. Coats CJ, Reid J, Wright S, et al. Papillary fibroelastoma arising from left ventricular outflow tract. Eur Heart J Cardiovasc Imaging. 2018;19:826.
21. Actis Dato GM, Calia C, Lodo V, et al. A rare case of papillary fibroelastoma involving the tricuspid valve. A single center experience over a period of 22 years (1999–2021). Acta Chir Belg. 2023;123:563–5.
22. Al-Mohammad A, Pambakian H, Young C. Fibroelastoma: case report and review of the literature. Heart. 1998;79:301–4. https://doi.org/10.1136/HRT.79.3.301.
23. Kashiwagi Y, Yoshida J, Itakura R, et al. Lung ventilation/perfusion scintigraphy shows the efficacy of anticoagulant therapy and surgical treatment for papillary fibroelastoma originating from the tricuspid valve. J Cardiol Cases. 2021;24:280–3. https://doi.org/10.1016/J.JCCASE.2021.04.022.
24. Tamin SS, Maleszewski JJ, Scott CG, et al. Prognostic and bioepidemiologic implications of papillary fibroelastomas. J Am Coll Cardiol. 2015;65:2420–9. https://doi.org/10.1016/J.JACC.2015.03.569.
25. Li Y, Tang M, Wu Q, et al. First report of a successful surgical management of left atrial myxoma coexisting with pulmonary squamous cell carcinoma and thymic cyst. Eur J Med Res. 2024;29:373. https://doi.org/10.1186/s40001-024-01974-6.
26. Shen X, Jin Y, Shen L, et al. Thymoma and thymic carcinoma associated with multilocular thymic cyst: a clinicopathologic analysis of 18 cases. Diagn Pathol. 2018. https://doi.org/10.1186/S13000-018-0719-7.
27. Betti M, Hoseini NH, Martin A, et al (2015) Cervical thymic cyst in childhood: a case report. Fetal Pediatr Pathol 34:65–69. https://doi.org/10.3109/15513815.2014.966181.
28. Gill S, Dhull P (2021) Association of Multilocular Thymic Cyst with Myasthenia Gravis. Neurol India 69:1094–1095. https://doi.org/10.4103/0028-3886.32530.
29. Sugai K, Nakaoka K, Tobita R, et al. A case of a shrunken multilocular mediastinal cyst that developed into thymic carcinoma with lung metastases 13 years later. Thorac Cancer. 2024;15:94–7. https://doi.org/10.1111/1759-7714.15174.
30. Wang Y, Saheb NABSA, Husanova F, et al. Concomitant minimally invasive surgery for tricuspid valve papillary fibroelastoma and right lung cancer in an elderly patient: a case report and review of the literature. J Cardiothorac Surg. 2023. https://doi.org/10.1186/s13019-023-02431-x.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.