

Huge Left Atrial Aneurysm With Severe Mitral Regurgitation: A Case Report

Nguyen Thi Viet Nga¹ , Nguyen Hoang Ha², Pham Thi Hue¹ , Le Quang Huy¹ 

¹ International Department, Hanoi Heart Hospital, Hanoi, Vietnam

² Department of Cardiac Surgery, Hanoi Heart Hospital, Hanoi, Vietnam

Abstract

Background: Huge left atrial aneurysm (LAA) is a rare cardiac anomaly that may be detected late, leading to serious complications such as systemic thromboembolism, arrhythmias, mitral regurgitation, and heart failure. Early surgical intervention is currently the standard treatment for symptomatic cases to prevent catastrophic consequences.

Case Presentation: A 31-year-old woman presented with progressively worsening shortness of breath and intermittent palpitations, diagnosed with a huge LAA and severe mitral regurgitation. Two surgeries were undertaken: the first was LAA ligation and mitral valve repair, followed 7 days later, by complete resection due to compression complications. The patient subsequently developed severe left ventricular dysfunction but recovered well after 10 days of intra-aortic balloon pump support and intensive medical treatment.

Conclusions: This case highlights the importance of appropriate surgical techniques and therapeutic challenges in managing patients with complex LAA.

Keywords: Huge left atrial aneurysm, Echocardiography, Computed tomography imaging, Surgical resection, Takotsubo cardiomyopathy

Citation: Nga NTV, Ha NH, Hue PT, Huy LQ. Huge left atrial aneurysm with severe mitral regurgitation: a case report. *Res Med J*. 20XX;XX(X):e276635. doi:10.33165/rmj.2027.e276635

Corresponding Author:
huepham8101998@gmail.com

Received: 25 July 2025

Revised: 8 March 2026

Accepted: 20 April 2026

Published Online:
29 April 2026



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Introduction

Left atrial aneurysm (LAA) is a rare cardiac anomaly characterized by abnormal focal or diffuse dilation of the left atrial wall, usually resulting from congenital muscular dysplasia, structural degeneration, or chronic hemodynamic stress.¹ Although sometimes asymptomatic, huge LAA may lead to significant clinical manifestations, including dyspnea, palpitations, atrial fibrillation, and thromboembolic events due to blood stasis within the aneurysmal sac. Left atrial enlargement can also cause distortion of adjacent structures and contribute to arrhythmias or valvular dysfunction.¹⁻³ Diagnosis is based on multimodal imaging — transthoracic and transesophageal echocardiography, cardiac computed tomography (CT), or magnetic resonance imaging (MRI) — which assess the size, morphology, thrombus presence, and impact on nearby structures. Surgical resection remains the treatment of choice for symptomatic or large aneurysms.^{2, 3} Medical management, including anticoagulation and rate/rhythm control, may be used in selected patients to control symptoms and reduce complications, especially when surgery is delayed or contraindicated.^{2, 3}

This case reports a young female patient presenting with a huge LAA complicated by atrial fibrillation and severe mitral regurgitation. The patient was successfully treated with aneurysmectomy and mitral valve repair.

Case Presentation

A 31-year-old woman with no significant past medical history presented to the hospital with progressive exertional dyspnea and intermittent palpitations over the past 2 months. She denied chest pain, syncope, fever, or weight loss. There was no history of rheumatic fever, hypertension, or known structural heart disease.

On physical examination, the patient was hemodynamically stable, though cardiac auscultation revealed an irregular rhythm with a rapid heart rate of 120 beats per minute. No murmurs, gallops, or peripheral edema were noted. The remainder of the physical exam was unremarkable. Initial laboratory testing revealed a mildly elevated N-terminal pro-B-type natriuretic peptide (NT-proBNP) level of 713 pg/mL.

Diagnostic Assessment

A 12-lead electrocardiogram (ECG) confirmed atrial fibrillation with a rapid ventricular response (Figure 1). Chest x-ray showed a markedly enlarged cardiac silhouette, raising suspicion for atrial enlargement or extracardiac mass. Transthoracic echocardiography (TTE) demonstrated a large echo-free cavity adjacent to the posterior wall of the left atrium, suggestive of a huge LAA (Figure 2A). The cavity communicated with the left atrial cavity via a wide neck and was associated with severe mitral regurgitation (Figure 2B). The left ventricular systolic function was preserved. Of note, the structure of the left atrial appendage was not clearly visualized on TTE, further supporting the suspicion of a left atrial aneurysm.

Chest CT confirmed a large aneurysmal sac at the inferolateral wall of the left atrium, measuring 116 × 105 × 100 mm, with a neck diameter of 66 mm (Figure 2C and 2D). The sac had smooth walls, with no evidence of thrombus or contrast extravasation. It caused compression and leftward displacement of the cardiac apex, as well as mild compression-induced collapse of the adjacent lung parenchyma. Notably, the normal structure of the left atrial appendage was clearly identified and distinguished from the aneurysmal sac. Baseline left ventricular function was preserved.

Figure 1. Electrocardiogram Revealed Atrial Fibrillation at Hospitalization

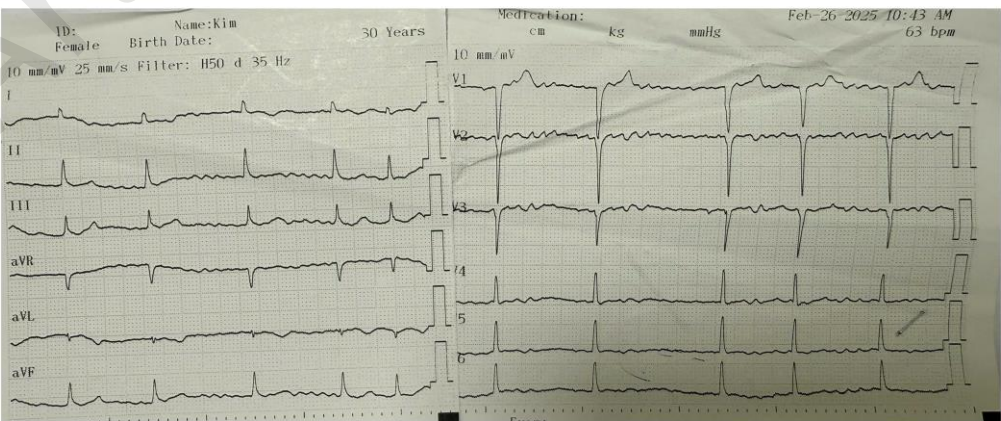
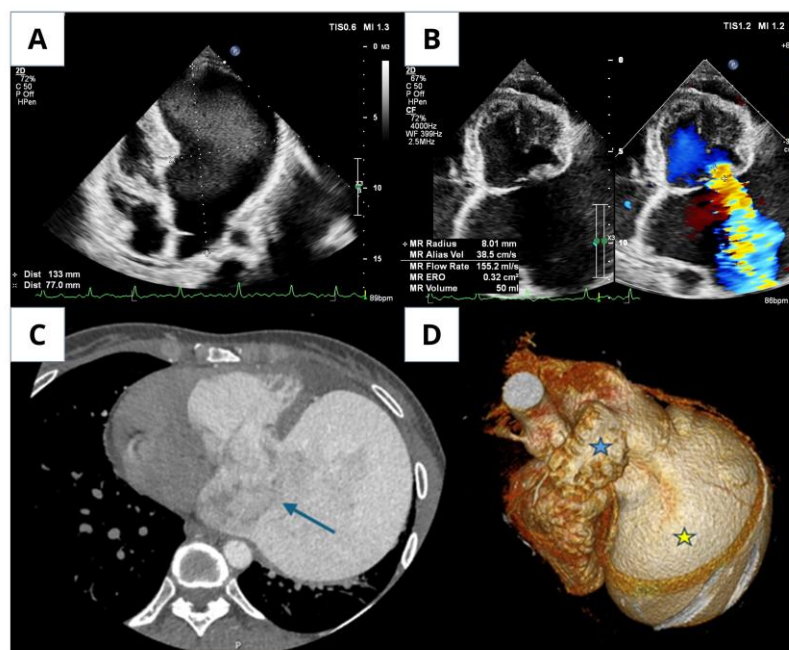


Figure 2. Multimodality Imaging of the Huge Left Atrial Aneurysm Associated With Severe Mitral Regurgitation at Hospitalization



A, Transthoracic echocardiography (TTE) revealed a large mass located at the posteroinferior wall of the left atrium, communicating with the left atrial cavity through a wide orifice.

B, TTE revealed severe mitral regurgitation.

C and D, Cardiac computed tomography revealed a large aneurysmal sac arising from the posterolateral wall of the left atrium (C, neck of aneurysm is marked by blue arrow; D, the left atrial appendage is marked by a blue star, and the left atrial aneurysm is marked by a yellow star for anatomical distinction).

Therapeutic Intervention

The patient initially underwent surgery via median sternotomy. Cardiopulmonary bypass (CPB) was established via ascending aortic cannulation and bicaval venous cannulation with snaring of both vena cavae. After cross-clamping the aorta, myocardial protection was achieved using intermittent antegrade warm blood cardioplegia with a high-potassium concentration, administered directly into the aortic root.

Intraoperative inspection revealed a huge LAA located posterolateral to the heart, with a wide neck measuring approximately 60 × 20 mm adjacent to the posterior mitral leaflet. The surgical procedure included closure of the aneurysmal orifice, excision of the left atrial appendage, and mitral valve repair. The repair was limited to a ring annuloplasty using a 32 mm Edwards Physio II ring, as the leaflets were morphologically normal and the regurgitation was functional due to annular dilation. CPB and aortic cross-clamp times were 88 and 72 minutes, respectively.

Postoperative recovery was initially stable with sinus rhythm restored by day 3. However, a residual mass was suggested on chest radiography the following day (Figure 3A). By day 7, the patient experienced recurrent atrial fibrillation along with persistent vomiting. Further evaluation with TTE and cardiac multidetector CT revealed a large residual LAA causing significant compression of the esophagus (Figure 3B and 3C).

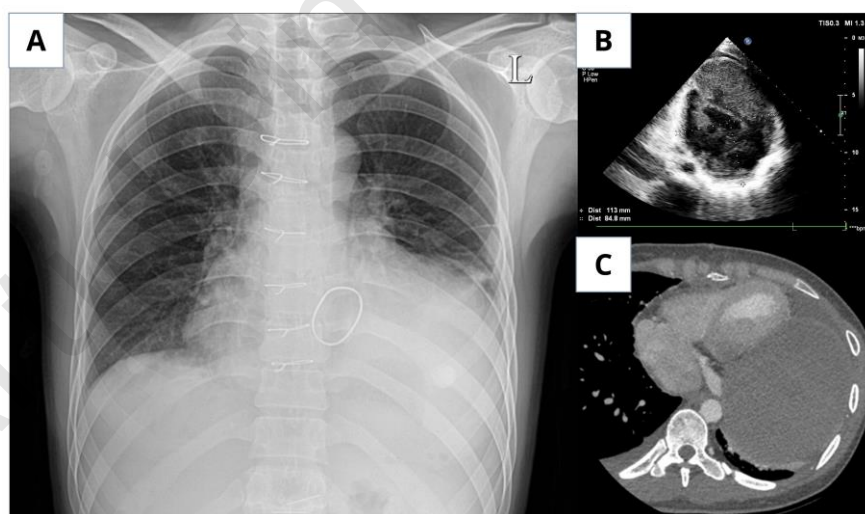
Due to ongoing rhythm disturbances and compressive symptoms, a second surgery was performed on postoperative day 10 for complete resection of the aneurysmal sac (Figure 4). Histopathological examination of the left atrial aneurysmal wall showed fibrosis with chronic inflammatory cell infiltration and vascular congestion, consistent with chronic inflammation of congenital origin (Figure 5).

However, shortly after reoperation, the patient developed severe global left ventricular systolic dysfunction with diffuse hypokinesis and left ventricular ejection fraction (LVEF) of 10% to 15%. Coronary angiography was performed and revealed no evidence of obstructive coronary artery disease. Given the absence of coronary stenosis, the acute onset of severe dysfunction following surgical stress, and the previously preserved ventricular function on admission, the findings were consistent with Takotsubo cardiomyopathy. The patient required intra-aortic balloon pump (IABP) support for 10 days and inotropic therapy. Her left ventricular function gradually improved, reaching an LVEF of approximately 30% before discharge.

Follow-Up

At 3-week postdischarge, the patient reported resolution of symptoms. Echocardiography confirmed recovery of left ventricular function with normalized wall motion and sinus rhythm maintenance.

Figure 3. Postoperative Residual Left Atrial Aneurysm

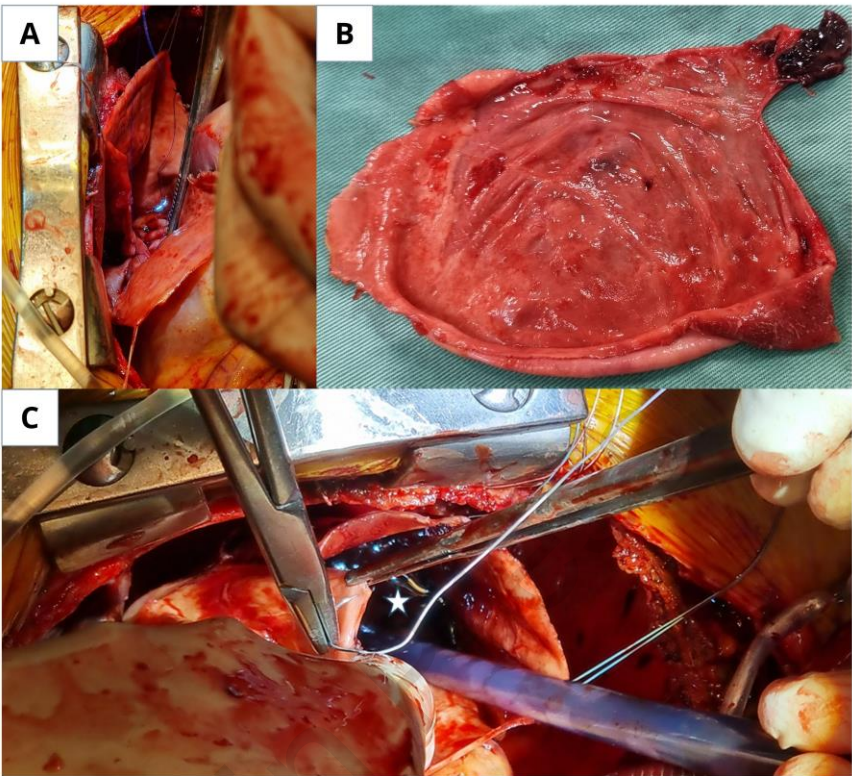


A, On postoperative day 4, chest radiography revealed cardiomegaly with abnormal contour of the left cardiac border.

B, On postoperative day 8, transthoracic echocardiography suggested a residual left atrial aneurysm, with heterogeneous hypoechoic structure inside.

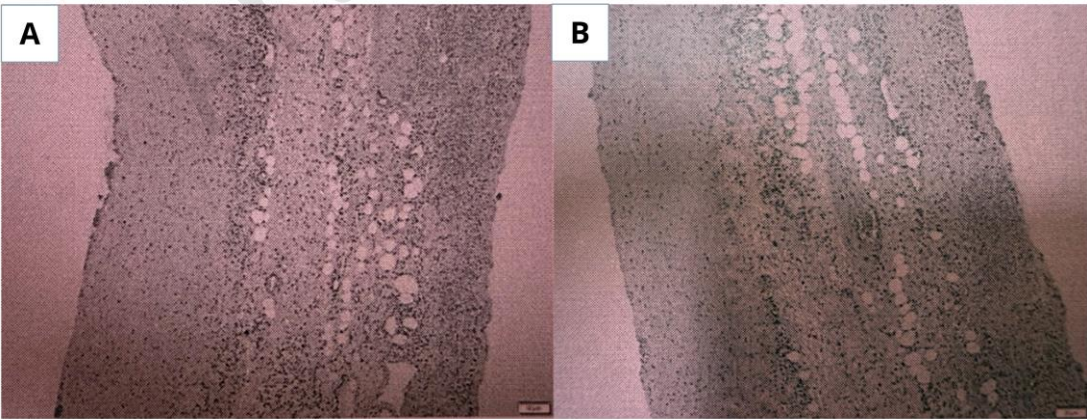
C, Cardiac computed tomography showed a well-defined fluid-density mass with blood-like characteristics adjacent to the left atrium and lateral wall of the left ventricle. No active contrast extravasation or vascular communication was identified. The mass mildly compressed the left atrium, left atrial veins, and the esophagus.

Figure 4. Surgical Resection and Macroscopic Appearance of the Left Atrial Aneurysmal Wall



A and C, The left atrial aneurysm sac containing multiple thrombi (marked with white star).
B, A sectioned view of the left atrial aneurysm sac.

Figure 5. Histology Showing the Wall of the Aneurysm Composed of Myocardium, Fibrotic Tissue and Vascular Congestion (Hematoxylin and Eosin)



A, Hematoxylin.
B, Eosin.

Discussion

Congenital aneurysms of the left atrial wall (ALAW) are exceedingly rare structural cardiac anomalies. The first case was formally described by Fry et al,⁴ although an earlier report by Semans et al⁵ in 1939 documented a patient with congenital mitral regurgitation and secondary left atrial dilation — likely not a true aneurysm. To date, no epidemiological studies have quantified the prevalence of ALAW, and the literature remains limited to isolated case reports. In contrast, congenital left atrial appendage aneurysm (LAAA) has been more frequently reported, with 177 cases in the literature.⁶ True aneurysms of the atrial body are far less common; Grinfeld et al² described 29 cases in 1985, and Cai et al³ added 9 more in a 2016 series. This case contributes to this limited body of evidence and underscores the importance of early recognition, accurate anatomical assessment, and individualized surgical planning.

The underlying mechanism of congenital LAA is typically attributed to localized dysplasia or inherent weakness of the atrial wall, particularly in the posterior or inferolateral segments. This is in contrast to acquired aneurysms, which may arise from rheumatic inflammation, trauma, or infective processes.¹ In this patient, there was no history of prior cardiac disease, and histologic analysis confirmed a true aneurysm composed of fibrous tissue with hypertrophied myocardium — findings consistent with a congenital origin.

Classification systems play a key role in preoperative planning. Congenital LAA has been categorized into 4 subtypes: 1) intrapericardial aneurysm of the atrial wall, 2) intrapericardial aneurysm of the appendage, 3) herniation through a pericardial defect, and 4) multiple saccular aneurysms.¹ This patient's lesion originated from the posterolateral atrial wall and lacked any pericardial defect, aligning with the first subtype.

Accurate preoperative diagnosis of ALAW relies on a comprehensive multimodal imaging strategy, as highlighted by Grinfeld et al² and Cai et al.³ In this patient, an abnormal cardiac silhouette on chest radiography raised initial suspicion, prompting further evaluation. TTE was crucial for early recognition, revealing a large, thin-walled cavity adjacent to the posterior left atrium with systolic-diastolic flow, and enabling timely assessment of mitral valve function.

To further define the aneurysm's morphology and its anatomical context, TEE provided high-resolution imaging of the aneurysm neck, origin, and mural thrombus. Cardiac CT and MRI confirmed the lesion's size and proximity to adjacent thoracic structures, offering essential spatial information for operative planning. In addition, 4D flow MRI identified regions of flow stasis and vortex formation within the sac, suggesting thrombotic risk and reinforcing the indication for surgical intervention.⁷ Together, these modalities offered a stepwise, integrative approach that not only confirmed the diagnosis but also informed risk stratification and surgical strategy.

An important differential diagnosis is LAAA, which arises from the atrial appendage and may involve embryological anomalies or pericardial defects. In contrast, LAA originates from the atrial body, particularly the posterior wall, and is more likely to produce compressive symptoms due to its anatomical proximity to thoracic structures.^{1-3, 6} In this case, the aneurysmal cavity was large, qualifying as a giant left atrium (GLA) based on standard definitions, and contributing to both mechanical compression and valvular dysfunction.⁸

The clinical manifestations of LAA are highly variable. While some patients remain asymptomatic, others may present with atrial fibrillation, systemic embolism, or compressive

complications depending on aneurysm size, location, and growth pattern.¹⁻³ In this case, the patient presented with exertional dyspnea and atrial fibrillation — symptoms suggestive of both electrical instability and volume overload.

Of particular note, imaging revealed severe mitral regurgitation, a relatively rare cooccurrence in LAA. The aneurysm's origin along the posterolateral atrial wall placed it in close proximity to the posterior mitral annulus. As the aneurysm expanded, it exerted mechanical tension on the annulus, leading to distortion and loss of coaptation, thereby generating functional mitral regurgitation. This in turn exacerbated left atrial volume and pressure, promoting further aneurysmal dilation in a self-perpetuating cycle.

This pathophysiological mechanism differs from other reported cases. In the series reported by Cai et al,³ only 3 patients underwent mitral valve repair, and severe mitral regurgitation was observed in 2: one reported by Stone et al,⁹ attributed to leaflet degeneration; and another by Wei et al,¹⁰ due to global annular dilation in a child with chronic atrial overload. In contrast, this patient had no primary valve pathology, and the mitral regurgitation was due to focal annular displacement caused by direct aneurysmal mass effect.

Understanding these distinct mechanisms is essential for both diagnosis and treatment. Even with morphologically normal leaflets, valve competence may be impaired by geometric distortion, necessitating surgical repair. This experience supports the notion that anatomical proximity to valvular structures — rather than aneurysm size alone — may dictate clinical impact and surgical strategy.

Surgical intervention remains the mainstay of therapy for ALAW, especially in symptomatic patients or those at risk of serious complications.¹⁻³ The standard approach involves median sternotomy with CPB, particularly when thrombus is present or the aneurysm is large and posterior. CPB allows for controlled resection and facilitates concomitant procedures such as mitral valve repair. Off-pump options may be considered in small, narrow-necked aneurysms with favorable anatomy.

Surgical decision-making must also address the choice between aneurysm neck ligation versus complete excision. In small, appendage-based aneurysms, ligation may suffice. However, in huge, wide-necked lesions — such as in this case — complete excision is often the only durable solution. Additionally, mitral valve repair should be performed if annular distortion or functional incompetence is present.⁹⁻¹¹

Initially, a conservative surgical strategy was adopted, involving aneurysmal neck ligation, left atrial appendage excision, and mitral valve repair. This decision was primarily influenced by intraoperative technical limitations and the perceived feasibility of isolating the aneurysm. However, the preservation of a residual aneurysmal volume proved ineffective, leading to a swift recurrence of symptoms, including esophageal compression and atrial fibrillation.

This study suggests that these postoperative complications resulted from acute hemodynamic changes within the residual sac. The partial ligation likely converted a previously compliant, low-pressure aneurysm into a high-pressure, distended chamber. The resulting increase in wall tension rendered the sac rigid, exerting direct mechanical compression on the posterior esophagus and manifesting as persistent vomiting. Similarly, the recurrence of atrial fibrillation was likely triggered by acute mechanical stretch on the residual atrial wall, which acted as a potent stimulus for arrhythmia. This 'stretch-induced' mechanism explains why the patient remained asymptomatic for decades; the aneurysm functioned as a stable, low-pressure system until the initial intervention acutely disrupted its anatomical and pressure balance. Ultimately, a definitive

reoperation with complete aneurysmectomy was required to resolve the mechanical symptoms and restore cardiac function.

This clinical trajectory reinforces a key principle: for large, posterior aneurysms involving the mitral annulus, definitive resection should be pursued from the outset. This experience contrasts with the majority of patients reported by Grinfeld et al² and Cai et al,³ where complete resection was typically achieved during the first procedure. Partial measures may provide temporary relief but carry a substantial risk of recurrence.

A limitation of this report is the short follow-up period of 3 weeks, which is insufficient to evaluate long-term recurrence. Clinical reports on similar atrial wall anomalies suggest that surveillance should primarily rely on the monitoring of clinical symptoms and serial echocardiographic assessments. While some studies have reported stable outcomes at the 6-month mark postresection, the rarity of this condition means that long-term data remain limited.^{2, 3} In this case, the complete resection achieved in the second surgery resulted in immediate symptomatic relief and stable echocardiographic findings; however, continuous and vigilant long-term follow-up is mandatory to ensure no late complications or structural changes arise.

Finally, the postoperative course was complicated by Takotsubo cardiomyopathy — a transient, stress-induced form of left ventricular dysfunction.¹² Prompt recognition and management with IABP and inotropes led to complete recovery. This underscores the importance of multidisciplinary coordination, vigilant hemodynamic monitoring, and individualized perioperative care in complex congenital cardiac cases.

Conclusions

This case suggests that complete surgical resection, supported by multimodality imaging and heart team collaboration, can be a viable treatment option for left atrial aneurysms. An individualized surgical approach is essential to address complex anatomy and ensure optimal outcomes.

Additional Information

Acknowledgments: The authors would like to thank the surgical and intensive care teams at Hanoi Heart Hospital, Vietnam for their dedicated care and support in managing this patient.

Informed Consent: Written informed consent was obtained from the patient and her legal guardians for the publication of this case report and any accompanying images. Institutional review board approval was not required for this single-patient case report. All identifying information has been removed to protect the patient's privacy.

Financial Support: No financial support was provided for this study.

Conflict of Interest: The authors declare no conflict of interest.

Author Contributions:

Conceptualization: Pham Thi Hue

Investigation: Nguyen Thi Viet Nga, Nguyen Hoang Ha, Le Quang Huy

Methodology: Nguyen Thi Viet Nga, Pham Thi Hue

Supervision: Nguyen Thi Viet Nga

Visualization: Nguyen Thi Viet Nga, Le Quang Huy

Writing – Original Draft: Pham Thi Hue

Writing – Review & Editing: Nguyen Thi Viet Nga, Nguyen Hoang Ha

References

1. Fakhri G, Obeid M, El Rassi I, et al. Large congenital left atrial wall aneurysm: an updated and comprehensive review of the literature. *Echocardiography*. 2020;37(6):965-970. doi:10.1111/echo.14687
2. Grinfeld R, Trainini JC, Roncoroni A, Fabrykant F, Cacheda H, Tripodi G. Congenital aneurysm of the left atrium. *Ann Thorac Surg*. 1985;39(5):469-471. doi:10.1016/s0003-4975(10)61961-3
3. Cai Y, Wei X, Tang H, Dian K. Congenital aneurysm of the left atrial wall. *J Card Surg*. 2016;31(12):730-734. doi:10.1111/jocs.12866
4. Fry W. Herniation of the left auricle. *Am J Surg*. 1953;86(6):736-738. doi:10.1016/0002-9610(53)90388-2
5. Semans JH, Taussig HB. Congenital "aneurysmal" dilatation of the left auricle. *Bull Johns Hopkins Hosp*. 1938;63(6):404-414.
6. Daralammouri Y, Odeh A, Abuzahra S, Azamtta M, Shawahna R. Left atrial appendage aneurysm: a descriptive systematic review of 177 cases. *BMC Cardiovasc Disord*. 2024;24(1):633. doi:10.1186/s12872-024-04323-x
7. Pradella M, Mozer AB, Baraboo JJ, et al. Blood flow dynamics in a giant left atrial appendage aneurysm visualized by 4D-flow CMR. *JACC Case Rep*. 2021;3(18):1924-1929. doi:10.1016/j.jaccas.2021.10.009
8. Apostolakis E, Shuhaiber JH. The surgical management of giant left atrium. *Eur J Cardiothorac Surg*. 2008;33(2):182-190. doi:10.1016/j.ejcts.2007.11.003
9. Stone KS, Brown JW, Canal D, Caldwell R, Hurwitz R, King H. Congenital aneurysm of the left atrial wall in infancy. *Ann Thorac Surg*. 1990;49(3):476-478. doi:10.1016/0003-4975(90)90262-5
10. Wei X, Zhang X, Tang H, Dian K. A rare case of giant left atrium in a child. *Eur Heart J*. 2016;37(8):683. doi:10.1093/eurheartj/ehv664

11. Zoghbi WA, Levine RA, Flachskampf F, et al. Atrial functional mitral regurgitation. *AJACC: Cardiovascular Imaging* expert panel viewpoint. *JACC: Cardiovasc Imaging*. 2022;15(11):1870-1882. doi:10.1016/j.jcmg.2022.08.016
12. Bouchaala A, Nafii O, Belharty N, Mesfioui MB, Oukerraj L, Cherti M. Surgery as precipitating factor of Takotsubo cardiomyopathy, characteristics and challenges: a case series. *IHJ Cardiovascular Reports*. 2024;8(1):32-35. doi:10.1016/j.ihjcvr.2024.04.002

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