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Systematic Review

Cluster Lambl's Excrescence on the Aortic Valve: A Case Report and Literature Review

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Abstract

Background: Lambl's excrescence (LE) presents challenges due to its small size and elusive nature. **Methods**: We present a case of an asymptomatic LE patient in which the patient recovered well and a literature review of LE involving the aortic valve (AV). **Results**: Transthoracic echocardiography revealed 10 × 4 mm strips of highly echoic attachment on the AV, swinging on the aortic side with high motion. The pathological analysis confirmed LE. The patient underwent surgical management, and the excrescence was successfully removed without damaging the AV. No complications were reported during the 18-month follow-up period. Of the 53 patients with LE (including the one in our report) aged 8–80, 18 were female, and 35 were male. The lengths of the LEs ranged from 1 to 32 mm. There were 6 asymptomatic cases, 25 ischemic stroke cases, 1 myocardial infarction case, 15 cases underwent surgical treatment, and 8 cases underwent simple surgical excision of the LE. The commonly used anticoagulants included warfarin, aspirin, clopidogrel, and rivaroxaban. The 27 patients were followed up with good results. **Conclusion**: For smaller LE, anticoagulants should be taken for a long time and monitored closely. We recommend surgical resection for large LE (longer than 2 cm), patients who have had more than one stroke, or those undergoing other simultaneous intracardiac operations.

Keywords

lambl's excrescence; excrescence; aortic valve; case report; literature review

Introduction

Lambl's excrescence (LE), first described by a physician, Vilém Dušan Lambl, in 1856, is a rare disease that typically occurs at the site of valve closure, mainly in the mitral and aortic valves, with thin, active, fibrous bundles of valves approximately 1 mm in diameter and up to 10 mm in length [1]. The pathogenesis is believed to be related to endothelial damage caused by valve wear and tear caused by exposure to high pressure. Histologically, they are non-cellular, consisting of a core of elastic connective tissue and a layer of endothelium [2]. The increasing incidence and detection rates of LE are attributed to advanced equipment and the popularity of echocardiography. Leitman *et al*. [3] identified 150 cases of LE (0.7%) among 21,000 color ultrasound examinations.

A small number of reports have been documented in the literature, but whether LE causes plug events and how to successfully manage them remains controversial due to a lack of clear treatment guidelines [4]. Therefore, special attention should be given to clinicians. Here, we report a case of LE of the aortic valve that was surgically resected. We also reviewed previously reported cases of LE in the aortic valve (AV). We also provide a comprehensive review of the pertinent literature to explore the clinical features, imaging findings, differential diagnosis, treatment options, and prognosis associated with LE. The CARE checklist was used when writing this case report (**Supplementary Table 1**).

Case Report

A 66-year-old woman with cervical intraepithelial neoplasia grade II (CIN2) underwent transthoracic echocardiogram (TTE), which revealed a 10 × 4 mm high echo attachment to the aortic surface on the aortic valve closure margin and a linear mobile structure attached to the aortic surface (Fig. 1A). Minor regurgitation of the AV and tricuspid valves was observed, along with a left ventricular ejection fraction (EF) of 55%. Considering the presence of an aortic valve, the patient was immediately referred to the Cardiac Surgery Department. The patient had no history of cerebral infarction or fever and cold. The vital signs were as follows: temperature, 36.5 °C; pulse, 74 beats/min; respiratory rate, 22 beats/min; blood pressure, 168/85 mmHg. On auscultation, the lungs had clear respiratory sounds, no rales, and no pleural friction. The cardiology examination revealed: a heart rate, of 74 beats/min; sinus rhythm; on auscultation, no pathological murmurs, additional murmurs, or pericardial fricatives were observed.

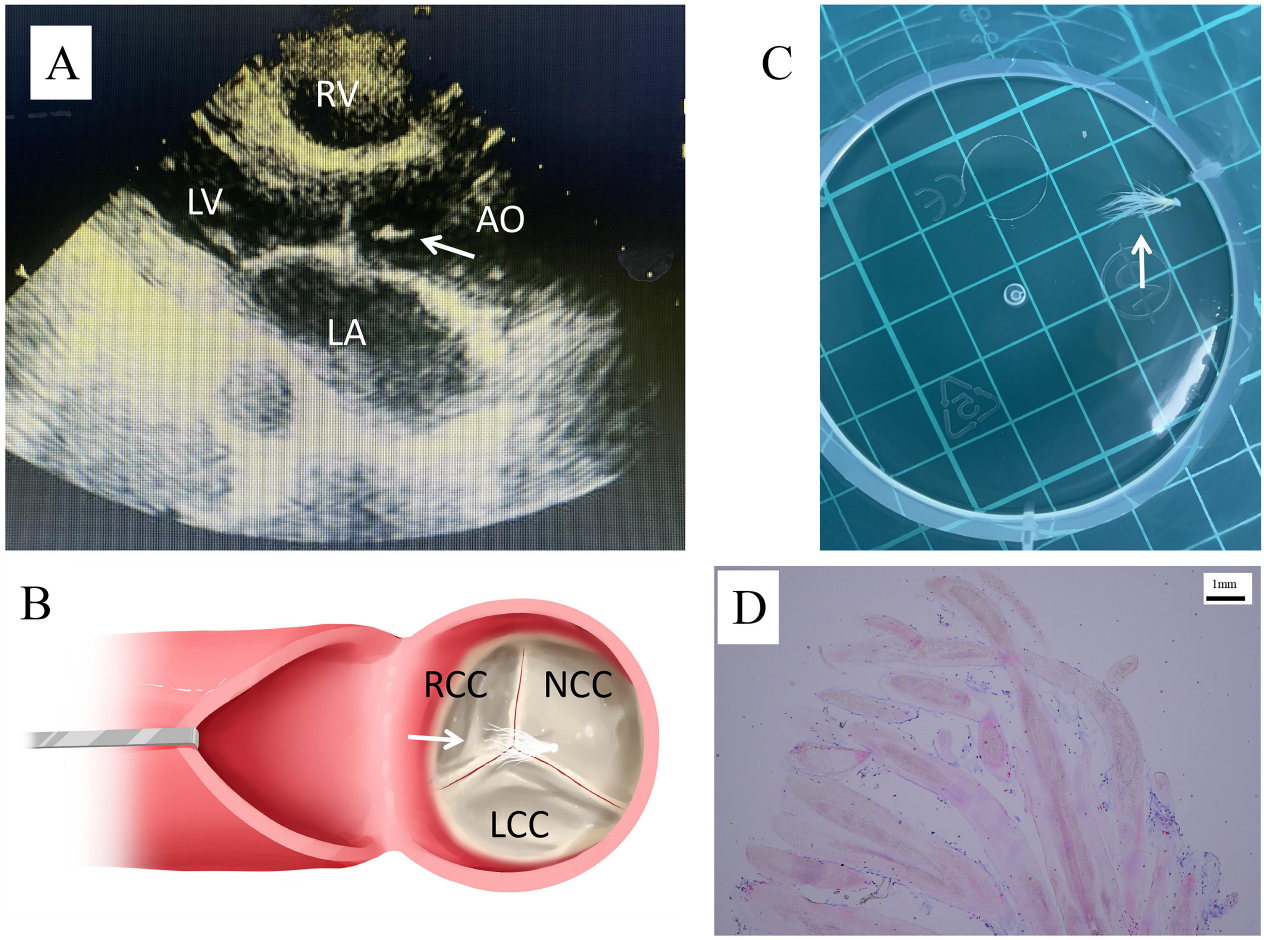

Fig. 1. Anatomical location and pathology of LE. (A) Transthoracic echocardiography revealed an excrescence on the aortic valve. (B) Schematic representation of the location of the excrescence. (C) The specimen of cluster lambl's excrescence after surgical removal. (D) Pathological: the original tissue was red-dyed glue with mucoid degeneration. The white arrow depicts the excrescence. AO, aorta; LA, left atrium; RV, right ventricle; LV, left ventricle; LCC, left coronary cusp of the aortic valve; RCC, right coronary cusp; NCC, noncoronary cusp.

Blood cultures obtained following admission were negative for pathogenic bacteria. Blood tests revealed the following: leukocyte count of 5.59 $\times$ 10^9/L, neutrophil count of 3.67 $\times$ 10^9/L, neutrophils 65.6% (40.0–75.0), eosinophil count 0.35 $\times$ 10^9/L (0.02–0.52), basophil absolute value 0.02, red blood cells 4.21 $\times$ 10^{12}/L; hematocrit 39%, international standardized ratio 0.96, plasma D dimer 1.350 mg/L (0–0.55), antistreptolysin O (ASO) 28.3 IU/mL (<116), rheumatoid factor <20. The plasma B-type natriuretic peptide was 57.6 pg/mL, and the erythrocyte sedimentation rate was 12 mm/h. The pre-hepatitis B S1 antigen was positive. Liver function, cholesterol, creatinine, triglyceride, total cholesterol, total bilirubin, C-reactive protein, and cystatin C levels were normal. Abdominal color ultrasonography findings were normal. A brain computed tomography (CT) scan revealed central lacunar cerebral infarction and age-related brain changes. Chest CT showed scattered inflammation in both the lungs (Fig. 2A).

The treatment team communicated with the patient and her family in detail about her condition. Considering the risk of embolism after detachment of the excrescence, and having seen the consequences of severe stroke in their relatives, they requested surgical removal of the LE. As such, we surgically resected the LE. Surgery under cardiopulmonary bypass was performed on 25 February 2022. A median sternotomy was performed. After establishing a cardiopulmonary bypass (CPB), the ascending aorta was blocked, and paraplegic blood was injected. The aorta was accessed through a standard transverse incision. Excrescence (white, approximately 10 mm long, clustered) was located at the edge of the uncrowned lobe near the noncoronary cusp (NCC) (Fig. 1B,C). It was then successfully removed without damaging the AV. The surgery went well; however, following surgery, the patient developed lung inflammation and a persistent cough. The test was negative for novel coronavirus nucleic acids, and the sputum smear was negative for tuberculosis bacilli. Postoperative chest

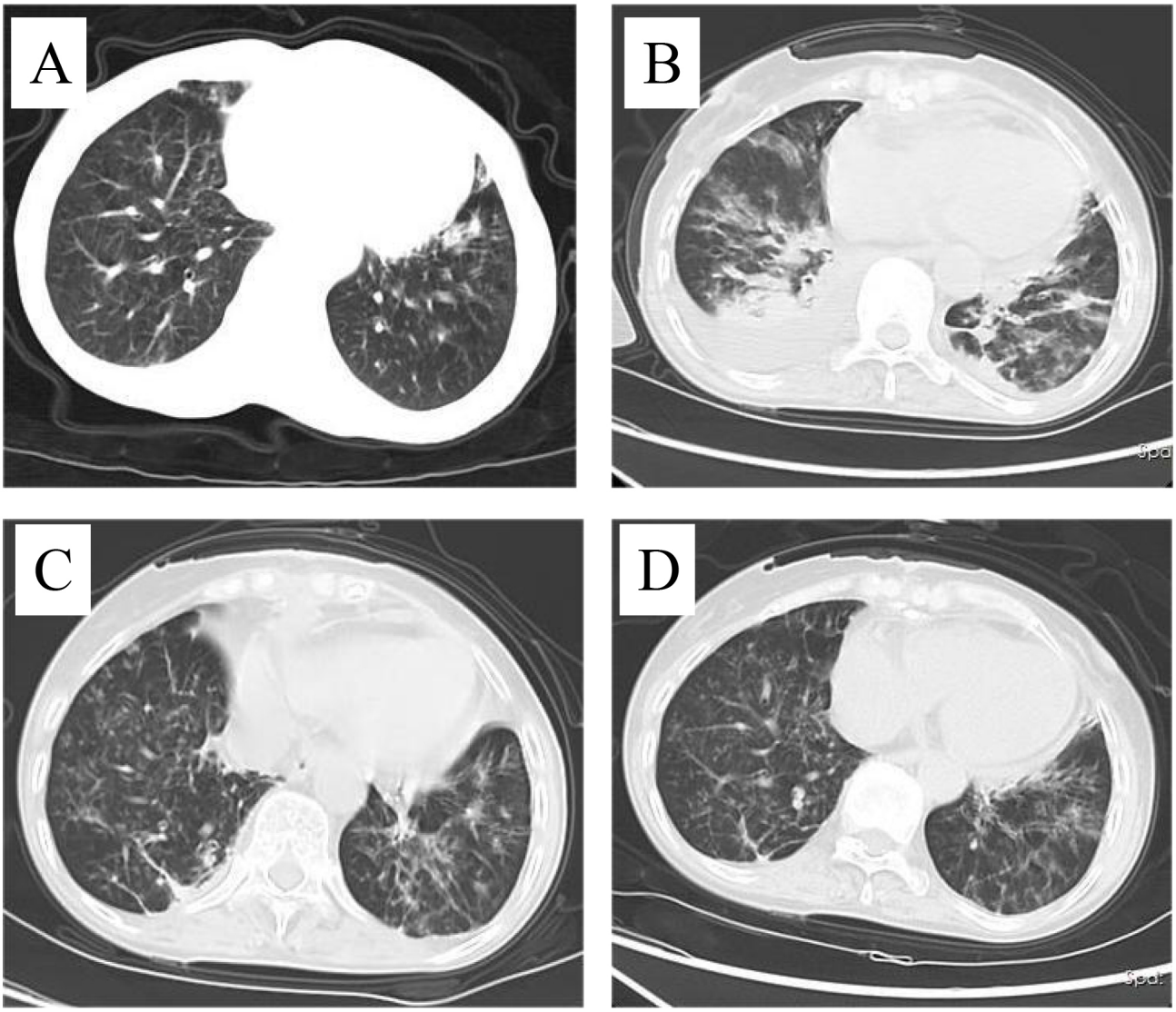

Fig. 2. Chest computed tomography (CT) reveals the gradual improvement of pulmonary inflammation after surgery. (A) On 12 February, 13 days before surgery. (B) On 3 March, 6 days after surgery. (C) On 8 March, 11 days after surgery. (D) On 17 March, 20 days after surgery.

CT was performed several times, considering the inflammation of the lung (Fig. 2B–D), and anti-infection treatment was administered. The patient was discharged after 20 days with no complications.

Pathological examination of the specimen revealed a gray tissue 10 mm in length. Under the microscope, the original tissue appeared as red-dyed glue with mucoid degeneration (Fig. 1D), consistent with the findings of LE. There were no complications during the follow-up period of 18 months.

Methods

We conducted an English literature search on the PubMed database for case reports between 1981 and 2023, using the keyword "Lambl's Excrescence, Aortic Valve"; the result was 36 studies, and 8 items were excluded. Five of the studies described large LEs, and two were excluded because they described cardiac papillary fibroblastoma. A total of 28 articles in English were reviewed, yielding 52 cases (Table 1, Ref. [1,2,5–29]).

Table 1. Reported cases of Lambl's Excrescence on the aortic valve.

Authors	Year	Age/Sex	Symptoms	Location	Size mm/shape	Management	Prognosis
Cha *et al*. [5]	1981	54/F	Incidental finding	TVS of AV and papillary muscle	l6 × 32/Six sea anemone	Surgical excision	NA
Aggarwal *et al*. [6]	2003	66/F	Ischemic stroke	LCC	25/Two trunks	Surgical excision	NA
Aziz *et al*. [7]	2007	61/F	Ischemic stroke	AV	1–4/Multiple projections	Surgical excision	Asymptomatic for 1 year
Jaffe *et al*. [8]	2007	80/F	Incidental finding	TVS, three AVC	NA/rows	NA	NA
Nakahira *et al*. [9]	2008	69/F	Incidental finding	LCC	12/Filamentous	Surgical excision	NA
Kalavakunta *et al*. [10]	2010	59/F	Ischemic stroke	TVS of AV	NA	Warfarin therapy	NA
Rhee *et al*. [11]	2010	21/M	Ischemic stroke	LCC	NA	Aspirin	Asymptomatic for 3 years
Liu *et al*. [12]	2012	53/M	Headache and ischemic stroke	RCC	7 × 2	Aspirin	Asymptomatic for 9-month
Liu *et al*. [12]	2012	30/M	Headache and ischemic stroke	RCC end NCC	6 × 3/Two thin	Surgical excision	Asymptomatic for 7-month
Morgan *et al*. [13]	2012	77/F	Incidental finding	AV	2–5/Multiple	Surgical excision, a	NA
Wu *et al*. [14]	2013	66/F	Ischemic stroke	AV	20	Warfarin	Asymptomatic for 6-month
Yacoub *et al*. [15]	2014	59/M	Ischemic stroke	TVS of AV	11/linear	Aspirin and Lipitor	NA
Davogustto *et al*. [16]	2015	68/F	Migraine headache and ischemic stroke	RCC	NA	Aspirin	Asymptomatic for 2-year
Marstrand *et al*. [17]	2015	48/M	Multiple cerebral infarctions	AV	10/thread-like frond	NA, b	NA
Chu *et al*. [18]	2015	51/F	Ischemic stroke	AV	2/wavy	Aspirin and Clopidogrel	Asymptomatic for 6-month
Zampi *et al*. [19]	2015	64/F	myocarditis and heart failure	AV	NA	Antiplatelet	NA
Pizzuti *et al*. [20]	2016	59/M	Myocardial Infarction	LCC	22/filiform	PCI and CABG, surgical excision	NA
Kamran *et al*. [21]	2016	74/F	Ischemic stroke	AV	NA	Anti-coagulation	NA
Chong-Lei *et al*. [22]	2018	17*M, 8*F	c	18 LCC, 7 RCC/NCC	3–13 mm	7 Surgical, 18 no Surgical	Asymptomatic for 1–5years
Amin *et al*. [23]	2019	48/M	Ischemic stroke	TVS of AV	1	Anticoagulation	Asymptomatic for 3-month
Çöllüoğlu *et al*. [24]	2019	8/M	Ischemic stroke	RCC or LCC	8.42	Anticoagulation	NA
Elkattawy *et al*. [25]	2020	33/M	Ischemic stroke	AV	NA	Aspirin and clopidogrel	NA
Figueiredo *et al*. [26]	2020	63/M	Ischemic stroke	AV	4	Vitamin K antagonist	Asymptomatic for 3 years
Hirayama *et al*. [27]	2020	74/M	Ischemic stroke, d	AV	Small protrusions	-	Autopsy
Shrestha *et al*. [1]	2022	73/M	Visual disturbance	TVS of LCC	6 × 3	Aspirin	Asymptomatic for 6-month
Alajjuri *et al*. [2]	2023	53/M	Ischemic stroke	AV	NA	Clopidogrel	Asymptomatic for 2 years
Hakobyan *et al*. [28]	2023	53/F	Ischemic stroke	AV	6 × 1/Filamentous strand	Anti-coagulation	NA
Ramanan *et al*. [29]	2023	48/F	Splenic infarct	TVS of AV	27	Rivaroxaban	NA
Ours	2023	51/F	Incidental finding	NCC, aortic side	10/Clusters	Surgical excision	Asymptomatic for 18-month

TVS, the ventricular surface; AV, aortic valve; AVC, aortic valve cusp; LCC, left coronary cusp of the aortic valve; RCC, right coronary cusp; NCC, noncoronary cusp; MVR, mitral valve replacement; PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting; NA, not reported. (a) MVR and removal of the thrombus from the left atrium; (b) TEE was performed under anesthesia, but the excrescence was no longer visible; (c) 12 atrial fibril/flutter cases, 8 cerebral infarction cases, 6 hypertension cases, 2 coronary heart disease cases, 2 rheumatic heart disease cases; (d) Colon cancer with liver metastasis case.

Results and Discussion

Differential diagnoses of Lambl's excrescence include infectious endocarditis, papillary fibroblastomas (PFE), myxoma, thrombus, and intimal flap of the AV [30]. Endocarditis infects patients with recent fever or cerebral infarction, or with elevated leukocyte count, erythrocyte sedimentation rate (ESR), ASO, and C-reactive protein levels. PFE is particularly difficult to distinguish from LE because they are histologically similar; however, they have some important features that can be distinguished on echocardiography: they are usually solitary when they occur, arising from the center of the valve, away from the closed valve line [31,32]. Our patient had no history of recent fever or cerebral infarction, and leukocyte count, ESR, ASO, and C-reactive protein levels were normal. Based on the morphology of the excrescence, we considered it to be either a benign hyperplastic excrescence or a benign cardiac tumor. The pathological findings after surgery were consistent with those of LE, which is a significant finding.

The LE is described as a single strand, row, or cluster [28]. Of the 53 patients with LE (including ours) aged 8–80, 18 were female, and 35 were male. The lengths of the LEs ranged from 1 to 32 mm. Multiple LEDs, similar in appearance to sea anemones, were observed in one surgically resected specimen [5]. With TTE in our case, row was observed that were later found to be clusters following excision, and the other cases were linear. Eleven cases described the location of the LE in the AV, mostly in the right and left coronary cusps of the aortic valve, and in our case, in the NCC. In eight cases, the excrescences were described as oscillating on the left ventricular surface, and in our case, the excrescence oscillated on the aortic side.

Imaging is crucial to confirm the diagnosis of LE. TTE is a sensitive method for observing excrescence and is the preferred method for diagnosing cardiac excrescence; however, transesophageal echocardiogram (TEE) is typically the best choice for assessing LE [33]. Histopathological examination helps differentiate between these conditions and is considered the gold standard. Ischemic stroke occurred in 25 of 53 patients. TTE or TEE is recommended for patients with a stroke of unknown etiology, because there have been cases of patients canceling surgery on the day of surgery due to the absence of excrescence [17], we recommend repeated testing and at least one reconfirmation before surgery.

Clinicians need to consider whether LEs are associated with embolic events [18,34]. However, LE is generally considered to be a rare cause of thromboembolism, usually arising from disruption or microthrombosis of the LE, leading to cerebrovascular accident (ischemic stroke, TIA), peripheral thromboembolism (retinal, renal, arterial), or acute coronary syndrome [2]. Of the 53 cases of LE (including ours), there were 6 asymptomatic cases, 25 ischemic stroke cases, 1 myocardial infarction case [20], 1 splenic infarct case [29], 1 myocarditis and heart failure case [19], 4 coronary heart disease cases, 1 case of colon cancer with liver metastases [27], 1 visual disturb acceptance case [1]. Mito *et al.* [35] found in an anatomic case that LE had blocked the left coronary artery, causing the patient to die of myocardial infarction. In another autopsy of death with stroke, metastatic colon cancer, dowry syndrome, and LE, Hirayama *et al*. [27] found similar histological findings of middle cerebral artery embolism and aortic valve lesions, which indicates that LE is the cause of stroke under the influence of hypercoagulable state. Leitman *et al*. [3] identified embolic events that occurred in 40 of the 150 patients with strands (27%), affecting their quality of life. An analysis [36] of 224 patients with recent stroke found that LE was still strongly associated with recent ischemic events (OR = 6.93; CI: 1.34–6.67; $p = 0.02$). Xie *et al*.'s [37] study also supports the hypothesis that microembolism on the detached LE may cause migraines. However, there are also studies with different views. Salehi Omran *et al*. [38] found LE in 207 stroke patients, TEE examined 54 patients (26.1%), but after multielement analysis, no association was found between LE and embolic stroke of uncertain origin (probability ratio 0.9%; 95% confidence interval 0.4–2.3). There is a close clinical association between LEs and thromboembolic events, but a direct causal relationship still requires extensive data and scientific studies.

At present, there are three common management options for LE: conservative observation, patients who take antiplatelet or anticoagulant agents, and surgical resection. Conservative observation is appropriate for asymptomatic patients with small LE. The commonly used anticoagulants include warfarin, aspirin, clopidogrel, and rivaroxaban. There is no systematic study of the difference in the effectiveness of these antiplatelet and anticoagulant drugs [2]. A patient with cryptogenic stroke, who was on anticoagulant therapy with aspirin alone, had an LE on her TEE at the time of her second stroke, and she began dual antiplatelet therapy with a follow-up of 6-months without symptoms [18]. One patient was treated with clopidogrel after a stroke event and a brief ischemic attack. A year later, he developed headache, inability to walk, speech disturbance, and blurred vision. He was treated with vitamin K antagonists and was symptom-free for 3 years [26]. Aziz *et al*. [7] suggested that LE on the aortic valve leaflet could rupture and cause embolism. Aggarwal *et al*. [6] reported a 66-year-old woman with a large LE on the aortic valve with a subparietal infarction who was treated with a full dose of anticoagulation therapy; however, three weeks later, she experienced another stroke, which required surgical resection. Surgical treatment is recommended for large LE (longer than 2 cm), patients who have had more than one stroke, or patients undergoing other simultaneous intracardiac operations. Of the 53 patients with LE, 15 underwent surgical treatment, 1 underwent aortic and mitral valve replacement [5], 3 underwent surgical excision mitral valve replacement

(MVR) [13,22], and 3 underwent coronary artery bypass grafting (CABG) [9,20,22]. Simple surgical excision of the LE was performed in only 8 cases. In our case, we recommend that the patient take an oral antiplatelet drug and observe, considering the risk of embolism after detachment of the excrescence, and having seen the consequences of severe stroke in their relatives (stroke unrelated to LE), her and her family they requested surgical removal of the LE. The choice between anticoagulation observation and surgical intervention must be made on an individual basis [4]. The decision of the patient and family should also be considered, given that the psychological burden and pressure in the process of observation and follow-up are different for each patient and family.

Follow-up was performed in 27 patients; the longest follow-up time was 5 years [22], and there were no reports of complications in the 27 patients. During follow-up, attention should be paid to whether the patient has had a cerebrovascular accident, the TTE or TEE, the size of LE changes, and the valve closure. In addition, it is also necessary to consider coagulation function and the practicality and side effects of anticoagulants. Our patient recovered well postoperatively, and there were no complications during the 18-month follow-up. We are open to the possibility that our treatment choices were not ideal. Given that clinicians have limited experience in diagnosing and treating the disease, we report this case with a literature review to provide a more comprehensive diagnosis and treatment of this disease.

Conclusion

The threshold for LE surgery is unclear; surgical treatment to remove the excrescence has successfully been performed in 15 cases. Among them, simple surgical excision of the LE was performed in only 8 cases. In the case of a definite diagnosis of LE, surgery is avoided as much as possible. For smaller LEs, anticoagulants should be taken for an extended period with close monitoring. TTE should be repeated at least once every 3 months. To avoid serious embolic events, we recommend surgical resection for large LE (longer than 2 cm), patients who have had more than one stroke, or those undergoing other simultaneous intracardiac operations. The PRISMA checklist was used when writing this review (**Supplementary Table 2**).

Availability of Data and Materials

Data supporting the findings of this study are available from the corresponding author upon request.

Author Contributions

CS and WD designed and performed the research study. GL and SY were responsible for data analysis and writing of the manuscript. WD provides methodological support. CWS and SZ helped gather information on the cases, read the full text and provided comments. All authors read and approved the final manuscript. All authors contributed to editorial changes in the manuscript. All authors have participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity.

Ethics Approval and Consent to Participate

The patient has provided informed consent for publication of the case. This study was approved by the Ethics Committee on Human Experiments of Bengbu Medical University (Protocol number 2020115).

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Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.59958/hsf.7179.

References

[1] Shrestha B, Pokhrel A, Oke I, Paudel A, Timlisina B, Parajuli P, *et al*. Lambl's Excrescences Associated with Cardioem-

bolic Stroke. The American Journal of Case Reports. 2022; 23: e934859.
[2] Alajjuri MA, Alajjuri OA, Alani FR. Lambl's Excrescence as an Etiology of Thromboembolism: Case Report and Literature Review. Clinical Medicine Insights. Case Reports. 2023; 16: 11795476231171391.
[3] Leitman M, Tyomkin V, Peleg E, Shmueli R, Krakover R, Vered Z. Clinical significance and prevalence of valvular strands during routine echo examinations. European Heart Journal. Cardiovascular Imaging. 2014; 15: 1226–1230.
[4] Ammannaya GKK. Lambl's Excrescences: Current Diagnosis and Management. Cardiology Research. 2019; 10: 207–210.
[5] Cha SD, Incarvito J, Fernandez J, Chang KS, Maranhao V, Gooch AS. Giant Lambl's excrescences of papillary muscle and aortic valve: echocardiographic, angiographic, and pathologic findings. Clinical Cardiology. 1981; 4: 51–54.
[6] Aggarwal A, Leavitt BJ. Images in clinical medicine. Giant Lambl's excrescences. The New England Journal of Medicine. 2003; 349: e24.
[7] Aziz F, Baciewicz FA Jr. Lambl's excrescences: review and recommendations. Texas Heart Institute Journal. 2007; 34: 366–368.
[8] Jaffe W, Figueredo VM. An example of Lambl's excrescences by transesophageal echocardiogram: a commonly misinterpreted lesion. Echocardiography (Mount Kisco, N.Y.). 2007; 24: 1086–1089.
[9] Nakahira J, Sawai T, Katsumata T, Imanaka H, Minami T. Lambl's excrescence on aortic valve detected by transesophageal echocardiography. Anesthesia and Analgesia. 2008; 106: 1639–1640.
[10] Kalavakunta JK, Peddi P, Bantu V, Tokala H, Kodenchery M. Lambl's excrescences: a rare cause of stroke. The Journal of Heart Valve Disease. 2010; 19: 669–670.
[11] Rhee HY, Choi HY, Kim SB, Shin WC, Kim SH. Acute Ischemic Stroke in a Patient with a Native Valvular Strand. Case Reports in Neurology. 2010; 2: 91–95.
[12] Liu RZ, Yu SY, Li Y. Migraine-like headache and ischemic strokes in two patients with Lambl's excrescences. Chinese Medical Journal. 2012; 125: 3346–3348.
[13] Morgan JA, Paone G. Resection of Lambl's excrescence on the aortic valve in a patient with rheumatic mitral valve disease and a left atrial thrombus. The Heart Surgery Forum. 2012; 15: E215–E217.
[14] Wu TY, Gerber IL, Roxburgh RH. Thrombo-embolic cerebral infarction secondary to giant Lambl's excrescence. Journal of Clinical Neuroscience: Official Journal of the Neurosurgical Society of Australasia. 2013; 20: 1632–1634.
[15] Yacoub HA, Walsh AL, Pineda CC. Cardioembolic stroke secondary to Lambl's excrescence on the aortic valve: a case report. Journal of Vascular and Interventional Neurology. 2014; 7: 23–25.
[16] Davogustto G, Fernando RR, Loghin C. Lambl's excrescence, migrainous headaches, and "tiger stripes": puzzling findings in one patient. Texas Heart Institute Journal. 2015; 42: 70–72.
[17] Marstrand P, Jensen MB, Ihlemann N. Valvular Excrescences: A Possible Transient Phenomenon. Case Reports in Cardiology. 2015; 2015: 380765.
[18] Chu A, Aung TT, Sahalon H, Choksi V, Feiz H. Lambl's Excrescence Associated with Cryptogenic Stroke: A Case Report and Literature Review. The American Journal of Case Reports. 2015; 16: 876–881.
[19] Zampi G, Pergolini A, Tinti MD, Alessi C, Sommariva L. Pitfall in Echocardiography: infective endocarditis or valvular strand? Case report. Medical Ultrasonography. 2015; 17: 256–258.
[20] Pizzuti A, Parisi F, Mosso L, Cali' Quaglia F, Tomasello A. Acute Myocardial Infarction in a Patient with Two-Vessel Occlusion and a Large Lambl's Excrescence. Case Reports in Cardiology. 2016; 2016: 8370212.
[21] Kamran H, Patel N, Singh G, Pasricha V, Salifu M, McFarlane SI. Lambl's excrescences: A case report and review of the literature. Clinical Case Reports and Reviews. 2016; 2: 486–488.
[22] Chong-Lei R, Sheng-Li J, Rong W, Cang-Song X, Yao W, Chang-Qing G. Diagnosis and Treatment of Lambl's Excrescence on the Aortic Valve. The Heart Surgery Forum. 2018; 21: E148–E150.
[23] Amin H, Jilani MH, Villarreal D. Lambl's Excrescences: An Enigma of Modern Diagnostic Cardiology. Cureus. 2019; 11: e6407.
[24] Çöllüoğlu T, Önalan O. An unusual cause of lacunar infarcts: Lambl's excrescences on aortic valve shown in detail by 3D transesophageal echocardiography. Oxford Medical Case Reports. 2019; 2019: omz110.
[25] Elkattawy S, Noori MAM, Sah A, Hasan Kazmi SM, Desai D. Lambl's Excrescences Associated With Left Frontal Ischemic Stroke: A Case Report. Cureus. 2020; 12: e9371.
[26] Figueiredo C, Rebelo CS, Lemos J. Cryptogenic Stroke and Valvular Strands. European Journal of Case Reports in Internal Medicine. 2020; 7: 001928.
[27] Hirayama T, Morioka H, Fujiwara H, Iwamoto K, Kiyozuka T, Takeo H, *et al*. An Autopsy Case of Lambl's Excrescences with Trousseau Syndrome that Caused Cardioembolic Stroke. Internal Medicine (Tokyo, Japan). 2020; 59: 3085–3088.
[28] Hakobyan N, Ilerhunmwuwa N, Wasifuddin M, Jamal F, Zagoruychenko T. An Unusual Source of Cerebral Embolism Caused by Lambl's Excrescences. Cureus. 2023; 15: e40910.
[29] Ramanan S, Singh H, Ahmed O, Zande M, Trimble M. A Rare Case of Splenic Infarct Secondary to Mobile Cardiac Echodensity. Cureus. 2023; 15: e46434.
[30] Hurrell H, Roberts-Thomson R, Prendergast BD. Non-infective endocarditis. Heart (British Cardiac Society). 2020; 106: 1023–1029.
[31] Daveron E, Jain N, Kelley GP, Luer WH, Fermin C, Helmcke F, *et al*. Papillary fibroelastoma and Lambl's excrescences: echocardiographic diagnosis and differential diagnosis. Echocardiography (Mount Kisco, N.Y.). 2005; 22: 461–463.
[32] Ahmad A, Arghami A, El-Am EA, Foley TA, Kurmann RD, Klarich KW. Case Report: A Tale of a Cardiac Mass: Looks Like a Papillary Fibroelastoma, Acts Like a Non-bacterial Thromboendocarditis. Frontiers in Cardiovascular Medicine. 2021; 8: 782926.
[33] Voros S, Nanda NC, Thakur AC, Winokur TS, Samal AK. Lambl's Excrescences (Valvular Strands). Echocardiography (Mount Kisco, N.Y.). 1999; 16: 399–414.
[34] Roldan CA, Shively BK, Crawford MH. Valve excrescences: prevalence, evolution and risk for cardioembolism. Journal of the American College of Cardiology. 1997; 30: 1308–1314.
[35] Mito M, Kiyuna M, Toda T, Sakugawa H, Nakada M, Yoza H, *et al*. A rare case report of incarceration of Lambl's excrescence of aortic valve resulting in myocardial infarction. Rinsho Byori. The Japanese Journal of Clinical Pathology. 2012; 60: 758–761.
[36] Velho FJP, Dotta F, Scherer L, Bartholomay E, da Silva DA, Fernandes JG, *et al*. Association between the effect of spontaneous contrast in the thoracic aorta and recent ischemic stroke determined by transesophageal echocardiography. Arquivos Brasileiros de Cardiologia. 2004; 82: 47–51, 52–56.
[37] Xie W, Wang X, Li R, Jia Z, Miao S, Liu Y, *et al*. Migraine-like headache in subjects with isolated Lambl's excrescences: a case series and literature review. The International Journal of Neuroscience. 2024; 1–9.
[38] Salehi Omran S, Chaker S, Lerario MP, Merkler AE, Navi BB, Kamel H. Relationship between Lambl's excrescences and embolic strokes of undetermined source. European Stroke Journal. 2020; 5: 169–173.