Case Report

Nepalese Heart Journal 2025; Vol 22(2), 71-74

Transcatheter Left Atrial Appendage Occlusion: First Case of Nepal

Chandra Mani Adhikari[1], Amrit Bogati[1], Birat Krishna Timalsena[1], Ravi Shahi[1], Sajjad Safi[1], Ram Kumar Shrestha[2], Dipanker Prajapati[1]

[1] Department of Cardiology, Shahid Gangalal National Heart Centre, Kathmandu, Nepal.
[2] Karuna Hospital, Kathmandu, Nepal.

Corresponding Author:
Chandra Mani Adhikari
Department of Cardiology
Shahid Gangalal National Heart Centre
Kathmandu, Nepal
Email: topjhap@gmail.com

Cite this article as: Adhikari CM, Bogati A, Timalsena BK, Shahi R, Safi S, Shrestha RK, Prajapati D. Transcatheter Left Atrial Appendage Occlusion: First Case of Nepal. Nepalese Heart Journal. 2025;22(2):71-74.

Submission Date: 24 September, 2025
Acceptance date: 19 October, 2025

Submitted using Care checklist

Abstract

Transcatheter left atrial appendage occlusion (LAAO) is a valuable therapeutic option for stroke prevention in patients with non-valvular atrial fibrillation at high bleeding risk. Worldwide acceptance of LAAO therapy as an alternative to oral anticoagulation is growing. The most recent 2025 SCAI/HRS Clinical Practice Guidelines on Transcatheter Left Atrial Appendage Occlusion suggests Oral anticoagulation (OAC) or LAAO as treatment options for stroke prevention. While most patients are offered stroke prevention with OAC, those with elevated bleeding risk, prior bleeding complications, or strong preferences to avoid long-term anticoagulation would reasonably choose LAAO over OAC. In this case report we describe the first successful transcatheter LAAO in Nepal in a 75 years old male with CHA2DS2-VASc of 3 and HAS-BLED score was 3. Though he was treated with oral anticoagulation to prevent stroke but due to hemoptysis he could not continue it. To prevent stroke patient party opted for the LAAO procedure. Under general anesthesia with Transesophageal echocardiogram guidance, patient underwent successful transcatheter LAAO with 31 mm Amulet device. He was discharged the next day of the procedure in stable condition without any complication.

DOI: https://doi.org/10.3126/nhj.v22i2.85797

Introduction

Transcatheter left atrial appendage occluder (LAAO) is an alternative to Oral Anticoagulant (OAC) that similarly lowers the risk of Non-valvular Atrial Fibrillation (NVAF) associated stroke.[1,2,3] For patients with NVAF who have decided to pursue stroke prevention treatment, the recent 2025 SCAI/HRS Clinical Practice Guidelines on Transcatheter Left Atrial Appendage Occlusion suggests Oral anticoagulation (OAC) or LAAO as treatment options. While most patients are offered stroke prevention with OAC, those with elevated bleeding risk, prior bleeding complications, or strong preferences to avoid long-term anticoagulation would reasonably choose LAAO over OAC.[4]

Worldwide acceptance of LAAO therapy as an alternative to OAC is growing. However, LAAO is recognised as a technically demanding procedure, requiring rigorous training and skills in order to reduce complications.[5] In the low resource setting like ours where there is a challenges of monitoring anticoagulation and bleeding risk with OAC LAAO can be a viable option when indicated.

In this case report we describe the first successful transcatheter LAAO in Nepal.

Case

A 75 years old Hypertensive, Chronic Obstructive Pulmonary Disease (COPD) patient under domiciliary oxygen with Atrial Fibrillation was initially treated with warfarin and NOAC. Due to hemoptysis, patient could not continue OAC. As patient family were looking for an alternate to Warfarin and NOAC for stroke prevention, he was referred to us for transcatheter LAAO to our center by his treating physician. He was hypertensive. His CHA2DS2-VASc was 3 and HAS-BLED score was 3. The procedure was planned with pre-procedural imaging using Cardiac CT Scan. Transesophageal Echocardiography (TEE) assessment was performed during the procedure to look for pericardial effusion, assess the mitral valve, analyze the LAA anatomy, rule out thrombus in the LAA, evaluate

for the presence of PFO (if any), and determine the appendage landing zone size. Cardiac CT and TEE measurements showed LAA ostial diameter of 27-28 mm and depth of 22-23 mm; a 31 mm Amulet was selected to achieve 10–15% compression.TEE was used to guide the procedure. Fig 1 and 2 showed LAA in TEE.

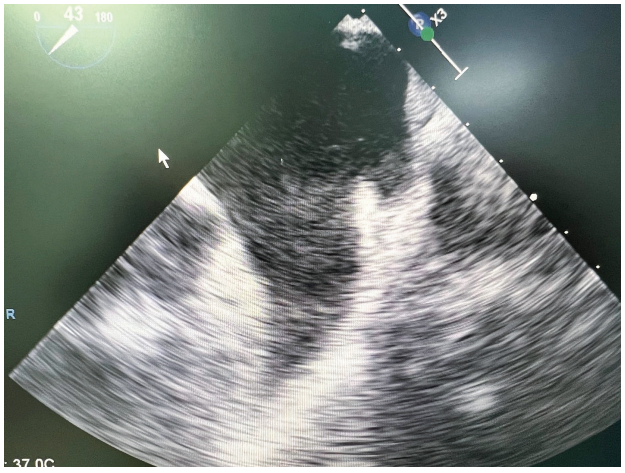

***Figure 1**. Mid-esophageal TEE, 43° view: pre-deployment showed LAA anatomy and absence of thrombus.*

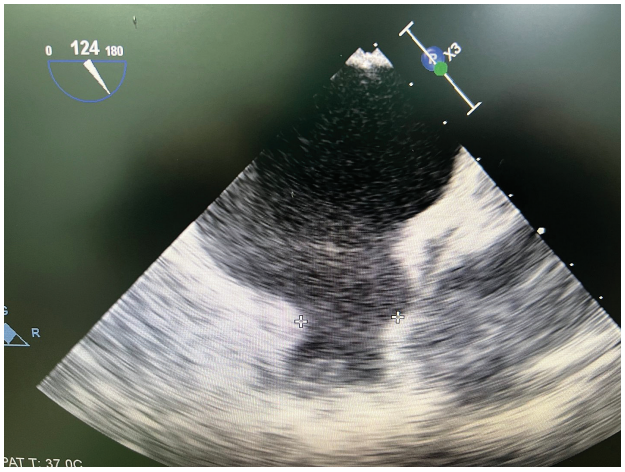

***Figure 2**. TEE Mid-esophageal 124° view showed LAA anatomy and absence of thrombus.*

Informed consent was obtained from the patient and his family. The procedure was done under general anesthesia. TEE was performed to provide imaging during the procedure. right femoral vein was cannulated followed by a transseptal puncture to reach the left atrium.

Femoral venous access is obtained in the right femoral vein. Transseptal puncture (TSP) was performed under TEE and fluoroscopic guidance in the inferoposterior portion of the fossa ovalis using Mullins sheath and The Brockenbrough needle. A TEE bicaval view show the superior and inferior portion of the fossa. This view allows us to place the transseptal needle at the inferior axis of the fossa. Once tenting of the atrial septum has been observed, TEE view was switches to a short-axis aortic view to show the anterior and posterior axis of the fossa. The puncture was performed at the posterior-inferior site to allow a direct approach to the LAA, located on the anterior surface of the heart. Unfractionated heparin was administered after the transeptal puncture with a target of an activated clotting time (ACT) of 250-300seconds.

A selective injection of contrast was carried out with the Mullins sheath in right anterior oblique (RAO) 30°/cranial 20° view as shown in Fig 3.

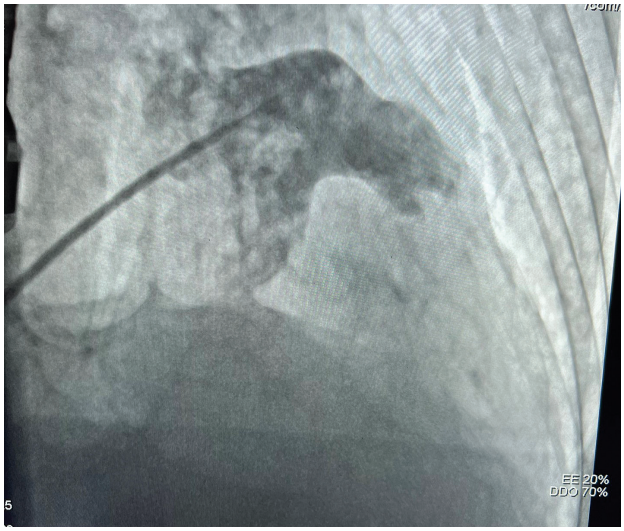

***Figure 3**. LAA in RAO-Cranial View*

A second angiogram is typically performed in an RAO 30°/caudal 20° view in order to have an orthogonal assessment as shown in Fig 4.

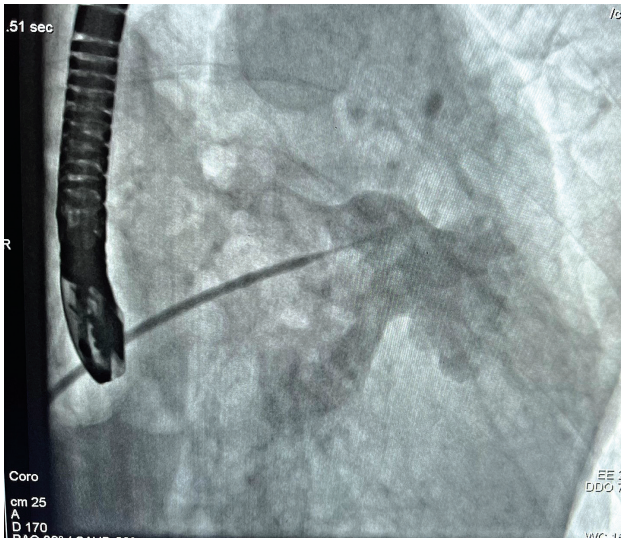

***Figure 4.** LAA in RAO-Caudal View*

Amplatzer Superstiff wire was introduced through the Mullins sheath in the Left upper pulmonary vein. On the Amplatzer Superstiff wire Abbott-Amplatzer specialized dual-angled delivery sheath was advanced to deliver 31 mm Amulet LAAO Device. The hemostatic valve included in the kit was connected to the device loader. Mechanical connections were verified, the device was mounted on the delivery cable, and pre-loaded into the loader. The system was de-aired by flushing heparinized saline through the side port of the valve. Once free of air, the loader was connected to the delivery sheath. Adequate back bleeding and absence of air bubbles confirmed readiness to advance the device.The device was advanced to the LUPV, creating an "onion bulb" formation for initial positioning. From there, the system was carefully withdrawn with counterclockwise rotation and slight forward movement to enter the appendage. Based on pre-planned landing zone measurements, the lobe was deployed and stabilized as shown in Fig. 5. Appropriate

compression was confirmed, and subsequently, the disc was deployed by retracting the sheath. Once both lobe and disc were in position, forward advancement of the delivery cable relieved tension from the system.Imaging was performed to rule out pericardial effusion, peri-device leak, and to confirm complete LAA occlusion. Patient was discharged on the second day of the procedure in stable condition without any complications. He was planned for follow up after a week. He will be on aspirin 75 mg daily + clopidogrel 75 mg daily for 6 months, then aspirin 75 mg daily lifelong. At 1-week of follow up, he was asymptomatic. TEE confirmed stable device position with no peri-device leak and normal left atrial size.

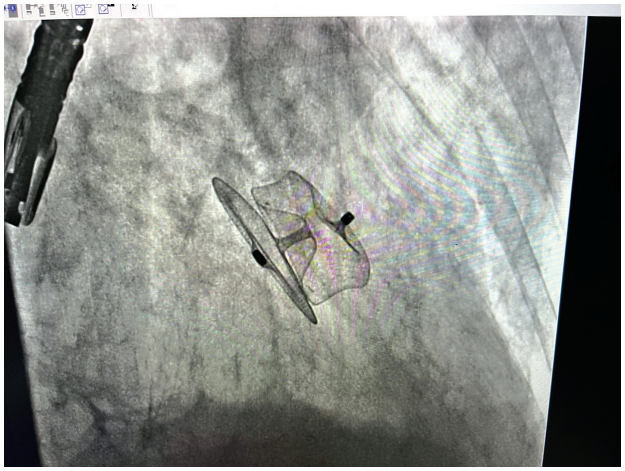

***Figure 5**. Final fluoroscopic image after deployment of 31 mm Amulet device showed appropriate device position.*

Discussion

In this case, we performed a successful transcatheter LAAO procedure by deploying a 31mm Amulet Device. Our case has indication for OAC therapy As the patient developed hemoptysis on OAC, the case is an ideal candidate for transcatheter LAAO. The LAAO procedure is an expensive preventive measure without any symptomatic benefits. Only those patients and their families who are educated and understand the importance of stroke prevention and bleeding complication of OAC will go for this therapy.

NVAF is a common arrhythmia associated with a nearly five-fold higher risk of systemic thromboembolism, in particular ischaemic stroke, as compared to general population,[6,7] due to thromboembolism from the left atrial appendage.[8] Therefore most recent guideline advocate the use of OAC for stroke prevention in males with a CHA2DS2-VA (congestive heart failure, hypertension, age, diabetes, stroke history, vascular disease,) score ≥ 2.[9] However, the occurrence of haemorrhagic complications or the diagnosis of medical conditions predisposing to bleeding events often imposes the withdrawal of OAC therapy.[10] It is suggested that less than 2/3 of patients with NVAF are treated with OAC[11]due to reasons including bleeding, medication nonadherence, medication cost, and patient preference.[12]

Transcatheter left atrial appendage occlusion (LAAO) is a valuable therapeutic option for the prevention of thromboembolic events reserved for patients with non-valvular AF and high bleeding risk. This procedure is non-inferior for stroke prevention as compared to OAC.2[3,13]

The rationale for the quest to close the LAA for stroke prevention is composed of three elements: the concept that atrial fibrillation (AF) causes strokes, the concept that strokes are associated with thrombus formation in the LAA, and that these thrombi cause strokes by embolization to the cerebral circulation.[14] It is suggested that LAA is responsible for thrombus formation in more than 90% of cases.[15]

The LAA is highly variable in terms of shape, length, number of lobes, and the presence of thrombus. Therefore, a pre-procedural meticulous characterization of the LAA anatomy, by TEE and/or cardiac computed tomography angiography (CCTA), is crucial to assess the anatomic suitability of transcatheter LAAO and to guide the proper device selection.[14]

The high cost of the device and the need for specialized training for the safe procedure may limit widespread applicability.

Conclusion

LAAO procedure is a viable option in patient who has contraindication to OAC or cannot tolerate OAC.

Acknowledgement

The authors wish to thank Dr. Bharat Purohit for his technical assistance during the procedure, Dr. Rabin Sundar Shrestha from the Department of Anesthesia, Shahid Gangalal National Heart Centre for anesthesia support during the procedure. Also, authors like to thank all the catheterization laboratory staff for their support during the procedure.

Conflicts of Interest

The authors declare no conflicts of interest.

References

1. Reddy VY, Sievert H, Halperin J, et al. Percutaneous left atrial appendage closure vs warfarin for atrial fibrillation: a randomized clinical trial. JAMA. 2014;312(19): 1988–1998. https://doi.org/10.1001/jama.2014.15192
2. Holmes Jr DR, Kar S, Price MJ, et al. Prospective randomized evaluation of the Watchman Left Atrial Appendage Closure device in patients with atrial fibrillation versus long-term warfarin therapy: the PREVAIL trial. J Am Coll Cardiol. 2014; 64(1):1–12. https://doi.org/10.1016/j.jacc.2014.04.029
3. Osmancik P, Herman D, Neuzil P, et al. Left atrial appendage closure versus direct oral anticoagulants in high-risk patients with atrial fibrillation. J Am Coll Cardiol.2020;75(25):3122–3135. https://doi.org/10.1016/j.jacc.2020.04.067
4. Andrew M. Goldsweig, Michael Glikson, MD, Jacqueline Joza, Clifford J. Kavinsky, Omar Khalique,Dhanunjaya Lakkireddy,et al. 2025 SCAI/HRS Clinical Practice Guidelines on Transcatheter Left Atrial Appendage Occlusion. Heart Rhythm 2025:S1547-5271.https://doi.org/10.1016/j.hrthm.2025.05.048
5. Apostolos Tzikas, Sameer Gafoor, David Meerkin, Xavier Freixa, Ignacio Cruz-Gonzalez, Thorsten Lewalter, Jacqueline Saw, et al. Left atrial appendage occlusion with the AMPLATZER Amulet device: an expert consensus step-by-step approach. Euro Intervention 2016;11:1512-1521. 10.4244/EIJV11I13A292
6. Hindricks G, Potpara T, Dagres N, Arbelo E, Bax JJ, Blomstrom-Lundqvist C, et al. 2020 ESC guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): the Task Force for the diagnosis and management

of atrial fibrillation of the European Society of Cardiology (ESC) developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Eur Heart J 2021;42:373–498. 10.1093/eurheartj/ehaa612.

7. McGrath ER, Kapral MK, Fang J, et al. Association of atrial fibrillation with mortality and disability after ischemic stroke. Neurology. 2013;81(9):825–832. https:// doi.org/10.1212/WNL.0b013e3182a2cc15
8. Transesophageal echocardiographic correlates of thromboembolism in high-risk patients with nonvalvular atrial fibrillation. The Stroke Prevention in Atrial Fibrillation Investigators Committee on Echocardiography. Ann Intern Med. 1998; 128(8):639–647. https://doi.org/10.7326/0003-4819-128-8-199804150-00005
9. Isabelle C. Van Gelder, Michiel Rienstra, Karina V. Bunting, Ruben Casado-Arroyo, Valeria Caso, Harry J.G.M. Crijns, Tom J.R. De Potter, Jeremy Dwight, Luigina Guasti, Thorsten Hanke, et al. 2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). European Heart Journal 2024:45, 3314–3414.https://doi.org/10.1093/eurheartj/ehae176
10. Federico Barocelli, Filippo Luca Gurgoglione, Marco Covani, Maria Alberta Cattabiani,Luigi Vignali. A giant left atrial appendage: a case report on the feasibility of closure with a custom-made device. European Heart Journal - Case Reports (2024) 8:1–6.https://doi.org/10.1093/ehjcr/ytad629
11. Navar AM, Kolkailah AA, Overton R, et al. Trends in oral anticoagulant use among 436 864 patients with atrial fibrillation in community practice, 2011 to 2020. J Am Heart Assoc. 2022;11(22), e026723. https://doi.org/10.1161/JAHA.122.026723
12. O'Brien EC, Holmes DN, Ansell JE, et al. Physician practices regarding contraindications to oral anticoagulation in atrial fibrillation: findings from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF) registry. Am Heart J. 2014;167(4):601–609.e1. https://doi.org/10.1016/j.ahj.2013.12.014
13. Reddy VY, Doshi SK, Sievert H, Buchbinder M, Neuzil P, Huber K, et al. Percutaneous left atrial appendage closure for stroke prophylaxis in patients with atrial fibrillation: 2.3-year follow-up of the PROTECT AF (Watchman Left Atrial Appendage Systemfor Embolic Protection in Patients with Atrial Fibrillation) trial. Circulation 2013;127: 720–729. 10.1161/CIRCULATIONAHA.112.114389
14. Glikson M, Wolff R, Hindricks G, Mandrola J, Camm AJ, Lip GYH, et al. EHRA/EAPCI expert consensus statement on catheter-based left atrial appendage occlusion—an update. EuroIntervention 2020;15:1133–1180. /doi/10.4244/EIJY19M08_01
15. Tsai LM, Lin LJ, Teng JK, Chen JH. Prevalence and clinical significance of left atrial thrombus in nonrheumatic atrial fibrillation. Int J Cardiol 1997; 58:163–169. 10.1016/s0167-5273(96)02862-8.