

Atrio-Esophageal Fistula with Acute Neurological Presentation Following Atrial Fibrillation Ablation: A Case Report

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CONFLICT OF INTEREST DISCLOSURE

The authors declare that they have no competing interests.

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Yes.

CONTRIBUTORSHIP

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HUMAN AND ANIMAL RIGHTS

Not applicable

ABSTRACT

Atrio-esophageal fistula (AEF) is a rare but catastrophic complication most commonly occurring after left atrial ablation procedures for atrial fibrillation. The condition carries an extremely high mortality rate if not promptly recognized.

It remains a diagnostic and therapeutic challenge due to its nonspecific clinical presentation and rapid progression. Early suspicion, prompt imaging (contrast-enhanced CT), and urgent surgical repair are critical for survival.

Here, we report the case of a 39-year-old patient who presented with neurological deficits, sepsis and chest pain 3 weeks after undergoing radiofrequency ablation for atrial fibrillation and was ultimately diagnosed with AEF.

CASE REPORT

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History & Clinical Data

A 39-year-old male with a past medical history of hypertrophic cardiomyopathy, hypothyroidism, obesity, and atrial fibrillation was admitted to the emergency department with suspicion of acute ischemic stroke. The patient had undergone a radiofrequency catheter ablation with pulmonary vein isolation for atrial fibrillation three weeks earlier, with initial procedural success. In the days following the intervention, he developed intermittent chest pain, fever, and elevated inflammatory markers. Blood cultures yielded no microbial growth, and both transthoracic echocardiography and cerebral CT were unremarkable. Despite this, the inflammatory syndrome persisted without a clear infectious source.

The patient re-presented with recurrent fever and malaise, this time associated with acute neurological deficits. On arrival to the emergency department, clinical examination revealed aphasia and left-sided hemiparesis. Shortly thereafter, he experienced generalized convulsive seizures, followed by postictal worsening to complete left hemiplegia.

Imaging Findings

Brain MRI revealed numerous cortical and subcortical diffusion-weighted hyperintensities with corresponding ADC restriction, consistent with acute ischemic lesions, most of its demonstrated concordant FLAIR hyperintensity. No evidence of intraluminal thrombus, parenchymal hemorrhagic transformation, or abnormal contrast enhancement was identified. Time-of-flight MR angiography of the circle of Willis demonstrated preserved proximal vascular permeability without stenosis, occlusion, or vessel wall irregularity. The multifocal distribution of the lesions, involving several arterial territories simultaneously, was inconsistent with a single vascular occlusion and instead favored an embolic pathophysiology.

At this stage, the constellation of chest pain, fever, and multifocal embolic infarctions in the context of a recent atrial fibrillation ablation raised concern for a severe periprocedural complication.

A chest CT was subsequently performed as part of the diagnostic work-up revealed multiple air bubbles within the

left atrial cavity in continuity with a fistulous tract arising from the esophagus, accompanied by pneumomediastinum and periesophageal inflammatory changes. These imaging features were strongly indicative of an atrio-esophageal fistula, correlating with the patient's acute systemic and neurological deterioration

Management & Follow-up

The patient was subsequently transferred to a referral center in Paris, where he underwent urgent surgical management consisting of a thoracotomy with closure of the left atrial defect, associated with esophagostomy and placement of a feeding jejunostomy. Before the operative course, concomitant pulmonary air embolism was also identified, further supporting the diagnosis of atrio-esophageal fistula as the underlying cause of his clinical deterioration. Remarkably, despite the severity of this life-threatening complication, the patient do not underwent severe complications during the postoperative follow-up, underscoring the importance of early recognition and aggressive multidisciplinary management

DISCUSSION

Etiology & Demographics

Atrio-esophageal fistula (AEF) is a rare but life-threatening complication that occurs primarily after left atrial ablation procedures for atrial fibrillation [1]. Although catheter ablation is now considered a standard therapeutic option for patients with symptomatic atrial fibrillation, the close anatomical relationship between the posterior wall of the left atrium and the esophagus exposes patients to the risk of thermal injury. The reported incidence of AEF ranges from 0.03% to 0.25% [2,3], yet its mortality rate often exceeds 50–80% despite aggressive treatment [4,5].

The pathophysiology of AEF involves direct thermal injury to the esophageal wall, ischemic damage from compromised microvascular circulation, or subsequent infection and necrosis leading to fistulous communication [6]. Clinical manifestations typically appear with a delay of 2 to 6 weeks after the ablation procedure [7]. Presenting symptoms are often nonspecific, including fever, chest pain, dysphagia, hematemesis, or neurological deficits due to air embolism [5,7]. Because of this delayed and varied presentation, diagnosis is frequently challenging and may be delayed [4,7].

Differential Diagnoses

Nonspecific and insidious symptoms make the diagnosis challenging, and several differential diagnoses should be considered when evaluating patients with fever, chest pain, hematemesis, or neurological deficits after left atrial ablation. Infective endocarditis can mimic AEF by causing fever, bacteremia, and septic emboli [8]. Esophageal perforation or mediastinitis may also present with chest pain, sepsis,

and mediastinal air, raising suspicion for esophageal injury unrelated to fistula formation [9]. Neurological manifestations such as stroke or transient ischemic attack may initially suggest thromboembolic complications of atrial fibrillation or ablation, rather than air embolism from a fistulous tract [10]. Other potential considerations include aspiration pneumonia [11], pericarditis, or intracardiac thrombus with systemic embolization [12]. Distinguishing these entities is crucial, as AEF requires urgent surgical intervention, whereas alternative diagnoses may be managed conservatively or with targeted antimicrobial or anticoagulant therapy.

Treatment & Prognosis

Contrast-enhanced chest CT is the imaging modality of choice and can demonstrate air within the left atrium, mediastinum, or evidence of a direct fistulous tract [5,13]. Endoscopy is contraindicated, as it may worsen the fistula or precipitate air embolism [5]. Once suspected, AEF constitutes a surgical emergency, as conservative management is almost uniformly fatal [13,14]. Surgical repair, either by direct closure of the atrial and esophageal defects or through more complex reconstructive approaches, remains the cornerstone of management.

Given its devastating prognosis, prevention and early recognition are crucial. Strategies such as esophageal temperature monitoring, avoidance of excessive energy delivery on the posterior atrial wall, and development of alternative ablation technologies aim to minimize risk [14,15]. Increased awareness among cardiologists, radiologists, and intensivists is essential for timely diagnosis and intervention.

TEACHING POINT

The current case highlights atrio-esophageal fistula as a rare but devastating complication of atrial fibrillation ablation. Early recognition with chest CT and urgent surgical repair are essential, as delayed diagnosis is almost uniformly fatal: awareness of this entity among clinicians and radiologists is crucial to improve outcomes.

QUESTIONS

1. What is the typical delay of clinical presentation for atrio-esophageal fistula after atrial fibrillation ablation?

- Within 24 hours
- 2–6 weeks
- 6–12 months
- Immediately during the procedure

Answer:

(b) Symptoms of atrio-esophageal fistula usually occur with a delay of 2–6 weeks after ablation.

2. What is the imaging modality of choice for diagnosing atrio-esophageal fistula?

- Chest X-ray
- Endoscopy

- c) Contrast-enhanced chest CT
- d) Esophageal manometry

Answer:

(c) Contrast-enhanced chest CT is the modality of choice; endoscopy is contraindicated due to the risk of worsening the fistula or causing air embolism.

3. Which of the following is not a typical clinical presentation of atrio-esophageal fistula?

- a) Chest pain
- b) Hematemesis
- c) Neurological deficits due to air embolism
- d) Progressive peripheral neuropathy

Answer:

(d) Progressive peripheral neuropathy is not a typical presentation; instead, patients often have chest pain, fever, hematemesis, or neurological events due to air embolism.

4. What is the mainstay of treatment for atrio-esophageal fistula?

- a) Broad-spectrum antibiotics alone
- b) Urgent surgical repair
- c) Endoscopic stent placement as definitive therapy
- d) Anticoagulation

Answer:

(b) Urgent surgical repair is the mainstay of treatment; conservative or medical management alone is almost uniformly fatal.

5. Which of the following is true regarding atrio-esophageal fistula?

- a) Endoscopy is the first-line diagnostic tool
- b) Mortality remains very low with delayed diagnosis
- c) The condition is rare but highly lethal if not recognized early
- d) It usually presents within 24 hours of ablation

Answer:

(c) Atrio-esophageal fistula is rare but associated with mortality rates exceeding 50–80%, especially if diagnosis and surgery are delayed.

REFERENCES

- [1] Cappato R, Calkins H, Chen SA, et al. Updated Worldwide Survey on the Methods, Efficacy, and Safety of Catheter Ablation for Human Atrial Fibrillation. *Circ Arrhythm Electrophysiol.* 2010; 3(1): 32-38. PMID: 19995881.
- [2] Ghia KK, Chugh A, Good E, et al. A nationwide survey on the prevalence of atrioesophageal fistula after left atrial radiofrequency catheter ablation. *J Interv Card Electrophysiol.* 2009; 24(1): 33-36. PMID: 18836822.
- [3] Schuring CA, Mountjoy LJ, Prialux AB, et al. Atrio-Esophageal Fistula: A Case Series and Literature Review. *Am J Case Rep.* 2017; 18: 847-854. PMID: 28761039.
- [4] He F, Zhang WM, Xu BJ, Huang GP, Chen HD. Atrioesophageal fistula after atrial fibrillation catheter ablation: A case report. *Medicine (Baltimore).* 2021; 100(2): e24226. PMID: 33466203.
- [5] Han HC, Ha FJ, Sanders P, et al. Atrioesophageal Fistula: Clinical Presentation, Procedural Characteristics, Diagnostic Investigations, and Treatment Outcomes. *Circ Arrhythm Electrophysiol.* 2017; 10(11): e005579. PMID: 29109075.
- [6] Tilz RR, Schmidt V, Pürerfellner H, et al. A worldwide survey on incidence, management, and prognosis of oesophageal fistula formation following atrial fibrillation catheter ablation: the POTTER-AF study. *Eur Heart J.* 2023; 44(27): 2458-2469.
- [7] Chavez P, Messerli FH, Casso Dominguez A, et al. Atrioesophageal fistula following ablation procedures for atrial fibrillation: systematic review of case reports. *Open Heart.* 2015; 2(1): e000257. PMID: 26380098.
- [8] Habib G, Lancellotti P, Antunes MJ, et al. 2015 ESC Guidelines for the management of infective endocarditis: The Task Force for the Management of Infective Endocarditis of the European Society of Cardiology (ESC). Endorsed by: European Association for Cardio-Thoracic Surgery (EACTS), the European Association of Nuclear Medicine (EANM). *Eur Heart J.* 2015; 36(44): 3075-3128. PMID: 26320109.
- [9] Romano MA, Bach DS, Pagani FD, Prager RL, Deeb GM, Bolling SF. Atrial reduction plasty Cox maze procedure: extended indications for atrial fibrillation surgery. *Ann Thorac Surg.* 2004; 77(4): 1282-1287. PMID: 15063252.
- [10] January CT, Wann LS, Calkins H, et al. 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society in Collaboration With the Society of Thoracic Surgeons. *Circulation.* 2019; 140(2): e125- e151. PMID: 30686041.
- [11] Marik PE. Aspiration pneumonitis and aspiration pneumonia. *N Engl J Med.* 2001; 344(9): 665-671.
- [12] Blackshear JL, Odell JA. Appendage obliteration to reduce stroke in cardiac surgical patients with atrial fibrillation. *Ann Thorac Surg.* 1996; 61(2): 755-759. PMID: 8572814.
- [13] Mohanty S, Santangeli P, Mohanty P, et al. Outcomes of atrioesophageal fistula following catheter ablation of atrial fibrillation treated with surgical repair versus esophageal stenting. *J Cardiovasc Electrophysiol.* 2014; 25(6): 579-584. PMID: 25013875.
- [14] Kapur S, Barbhaiya C, Deneke T, Michaud GF. Esophageal Injury and Atrioesophageal Fistula Caused by Ablation for Atrial Fibrillation. *Circulation.* 2017; 136(13): 1247-1255.
- [15] Cooper J, Joseph C, Zagrodzky J, et al. Active esophageal cooling during radiofrequency ablation of the left atrium: data review and update. *Expert Rev Med Devices.* 2022; 19(12): 949-957. PMID: 36413154.

FIGURES

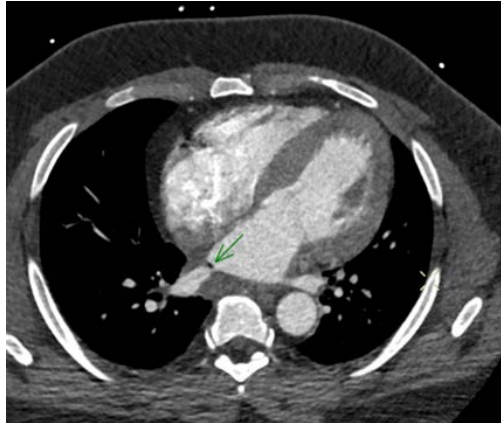


Figure 1 : 39-year-old male with atrio-esophageal fistula after atrial fibrillation ablation.

FINDINGS : Axial contrast-enhanced chest CT (arterial phase) demonstrates air bubbles within the left atrium (arrow) contiguous with the posterior wall of the esophagus, with periesophageal inflammatory changes.

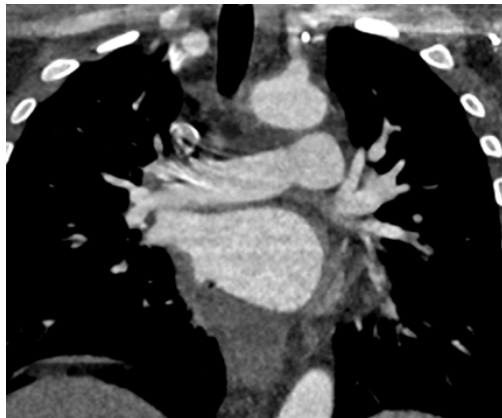


Figure 2 : 39-year-old male with atrio-esophageal fistula after atrial fibrillation ablation.

FINDINGS : Coronal reformatted contrast-enhanced chest CT highlights the fistulous tract between the esophagus and the left atrium, with associated pneumomediastinum.

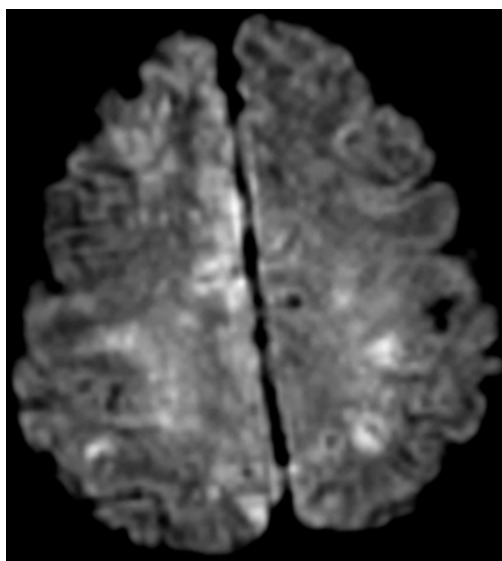


Figure 3 : 39-year-old male with multifocal embolic infarcts secondary to atrio-esophageal fistula after atrial fibrillation ablation.

FINDINGS : Axial brain MRI, diffusion-weighted imaging (b=1000), shows multiple cortical and subcortical hyperintense lesions (arrows) in different vascular territories, consistent with acute embolic infarcts.

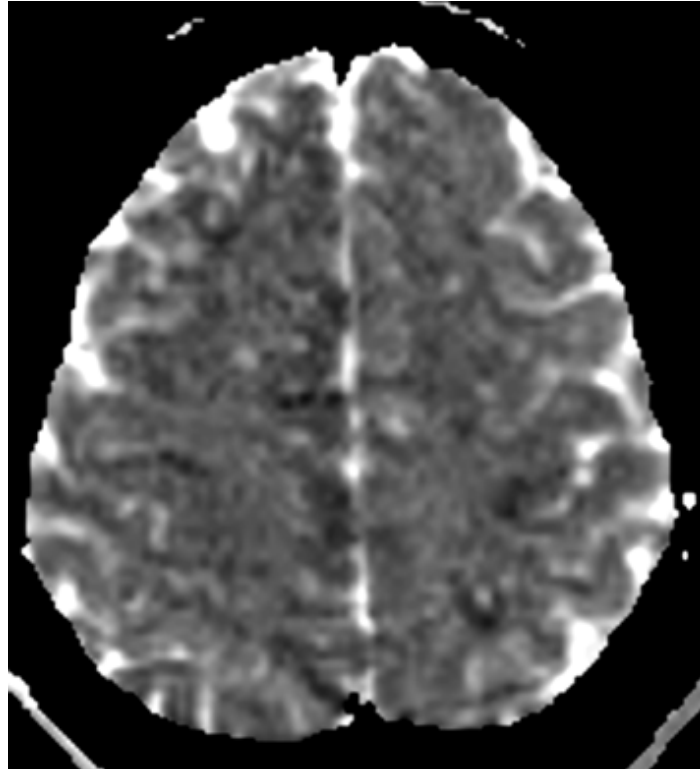


Figure 4: 39-year-old male with multifocal embolic infarcts secondary to atrio-esophageal fistula after atrial fibrillation ablation. FINDINGS : Corresponding ADC map confirms restricted diffusion with hypointense signal.

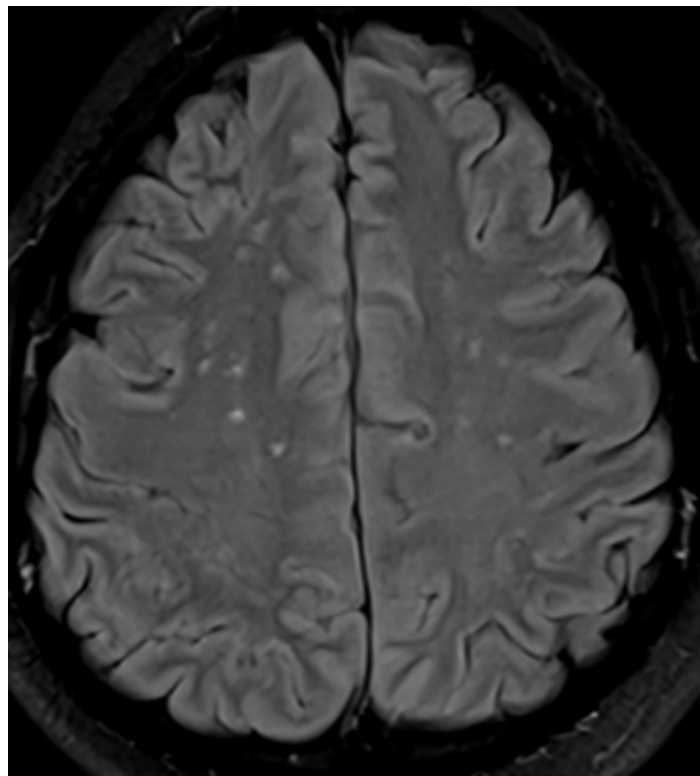


Figure 5: 39-year-old male with multifocal embolic infarcts secondary to atrio-esophageal fistula after atrial fibrillation ablation. FINDINGS : Axial FLAIR sequence demonstrates hyperintense lesions in the same regions, supporting acute ischemic changes.

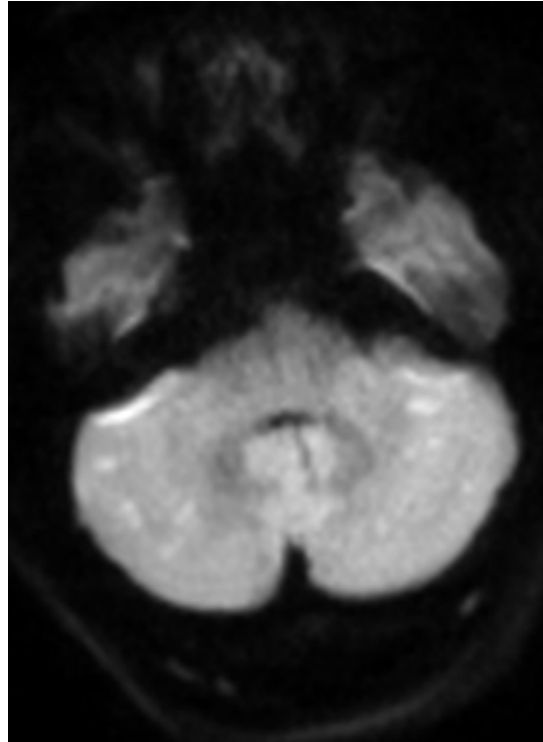


Figure 6: 39-year-old male with multifocal embolic infarcts secondary to atrio-esophageal fistula after atrial fibrillation ablation. FINDINGS : Axial brain MRI, diffusion-weighted imaging (b=1000), demonstrates bilateral hyperintense lesions in the cerebellar hemispheres (arrows), consistent with acute embolic infarcts.

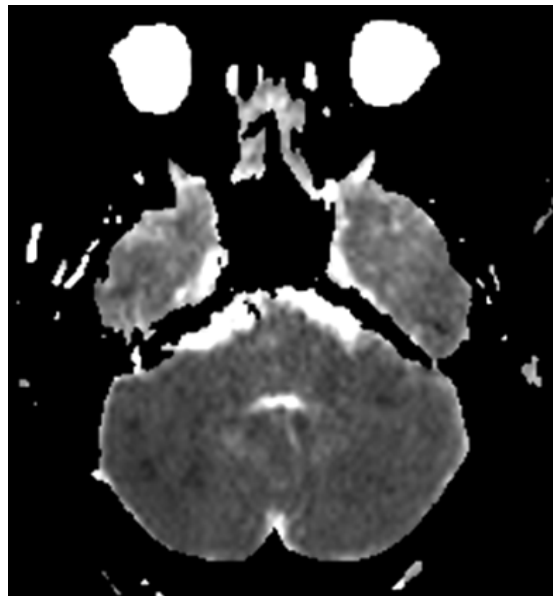


Figure 7: 39-year-old male with multifocal embolic infarcts secondary to atrio-esophageal fistula after atrial fibrillation ablation. FINDINGS : Corresponding ADC map shows low signal intensity confirming restricted diffusion and supporting the diagnosis of acute ischemia.

TECHNIQUE :

CT: Multidetector CT of the chest with intravenous iodinated contrast (100 mL, injection rate 4 mL/s), acquired in the arterial phase at 25 s post-injection; 120 kV, 250 mAs, 1 mm slice thickness; multiplanar reconstructions in axial and coronal planes. MRI: Brain MRI performed on a 1.5T scanner. Axial DWI (TR/TE = 3000/80 ms, b-values 0 and 1000 s/mm²), ADC maps generated automatically; axial FLAIR (TR/TE/TI = 9000/120/2500 ms, slice thickness 5 mm).

SUMMARY TABLE

Etiology	Atrio-oesophageal fistula following atrial fibrillation ablation
Incidence	0.03–0.25% of atrial fibrillation ablation procedures
Gender Ratio	None clearly established
Age Predilection	Middle-aged adults undergoing atrial fibrillation ablation
Risk Factors	Atrial fibrillation ablation (radiofrequency > cryoablation), posterior left atrial wall proximity, high ablation energy, esophageal vulnerability
Treatment	Urgent surgical repair (closure of atrial and esophageal defects ± esophageal diversion and feeding jejunostomy)
Prognosis	Mortality 50–80% if diagnosis delayed; early recognition and surgery improve survival
Imaging Findings	- Chest CT: air within the left atrium, pneumomediastinum, periesophageal inflammatory changes, direct fistulous tract - Brain MRI: multifocal embolic infarcts in multiple vascular territories, diffusion restriction with FLAIR hyperintensity - Angio-MRI: preserved large vessel permeability, excluding major occlusion

DIFFERENTIAL DIAGNOSIS TABLE

Diagnosis	CT Findings	MRI Findings	Other Imaging / Notes
Atrio-esophageal fistula (AEF)	Air bubbles in left atrium, pneumomediastinum, periesophageal inflammation, direct fistulous tract	Multiple acute embolic infarcts in different vascular territories (DWI hyperintensity + ADC restriction + FLAIR hyperintensity)	Endoscopy contraindicated (risk of worsening fistula and air embolism)
Infective endocarditis	Intracardiac vegetations may be detected indirectly (calcifications, masses), possible septic emboli	Embolic strokes, microabscesses; enhancement on contrast sequences	Echocardiography (TTE/TEE) usually diagnostic
Esophageal perforation / mediastinitis	Pneumomediastinum, esophageal wall thickening, periesophageal fluid/air collections	Not first-line; may show adjacent inflammatory changes	Contrast esophagography may show leak
Ischemic stroke (thromboembolic)	CT may be normal early; no mediastinal abnormalities	DWI/FLAIR lesions in a single vascular territory	Vascular imaging (CTA/MRA) may show occlusion
Aspiration pneumonia	Patchy or lobar consolidation, peribronchial thickening	Usually nonspecific; restricted to lung parenchyma	May be confirmed clinically with aspiration history
Pericarditis	Pericardial effusion, thickening	Pericardial enhancement on post-contrast sequences	Echocardiography confirms effusion

KEYWORDS

Atrio-esophageal fistula-Atrial fibrillation-Catheter ablation- Stroke- Cerebral embolism

ABBREVIATIONS

ADC = Apparent Diffusion Coefficient
AEF = Atrio-Esophageal Fistula
AF = Atrial Fibrillation
CT = Computed Tomography
FLAIR = Fluid-Attenuated Inversion Recovery
MRI = Magnetic Resonance Imaging
TOF = Time-Of-Flight (MR Angiography)

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