

Brief Communication: Atrial–Esophageal Fistulas after Radiofrequency Ablation

Jennifer E. Cummings, MD; Robert A. Schweikert, MD; Walid I. Saliba, MD; J. David Burkhardt, MD; Fethi Kilikaslan, MD; Eduardo Saad, MD; and Andrea Natale, MD

Background: Ablation of atrial fibrillation is generally considered safe and effective. However, atrial–esophageal fistulas have recently been reported as a rare but fatal complication.

Objective: To describe 9 patients with atrial–esophageal fistulas after ablation for atrial fibrillation.

Design: Retrospective case series.

Setting: Institutions where cardiologists performed atrial fibrillation ablation procedures.

Patients: 9 patients with atrial–esophageal fistulas after atrial fibrillation ablation.

Measurements: Demographic characteristics, mortality, presenting signs and symptoms, and days to presentation.

Results: Patients presented a mean of 12.3 days (range, 10 to 16 days) after their procedures. Nonspecific symptoms included fever,

leukocytosis, and neurologic abnormalities. All patients died. Only 4 patients received correct diagnoses before death, although all patients presented to a physician. In 3 patients, surgical repair was attempted.

Limitations: Few physicians reported cases, and only approximate numbers of procedures performed by the physicians are known. Thus, the authors could not estimate the incidence of atrial–esophageal fistulas after ablation.

Conclusions: Formation of atrial–esophageal fistulas is a rare but potentially devastating complication of atrial fibrillation ablation. This disorder may have an indolent presentation and may mimic other disease states, such as stroke or sepsis.

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For author affiliations, see end of text.

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Catheter ablation around the pulmonary vein region of the posterior left atrium is increasingly used to cure atrial fibrillation. Generally, the procedure is safe and effective (1), but the posterior wall of the left atrium is adjacent to the esophagus (Figure) and radiofrequency ablation procedures may substantially elevate the temperature within the esophageal lumen (2). Atrial–esophageal fistulas may result from this thermal injury and subsequent necrosis. We searched English-language and non-English-language literature through January 2006 using MEDLINE and found 3 reported cases of this complication following percutaneous atrial fibrillation ablation (3, 4). In this report, we describe an additional 9 patients who developed atrial–esophageal fistulas after catheter ablation for atrial fibrillation.

METHODS

Although devastating complications of procedures are infrequently systematically reported, physicians performing these procedures sometimes discuss them informally. Thus, we used an anonymous volunteer reporting method to identify cases that occurred between January 2004 and December 2005. We contacted physicians at several institutions who had treated patients with this complication and asked them to provide us with relevant medical records without identifying features. We then reviewed the medical records and entered demographic, clinical presentation, treatment, and survival data into the Cleveland Clinic Atrial Fibrillation Database. All physicians agreed to publication of general case information provided that the iden-

tity of the patients, themselves, and their institutions remained anonymous. Studies using the Atrial Fibrillation Database have been approved by the Cleveland Clinic Institutional Review Board.

No funding was received to support this study.

RESULTS

Physicians reported 9 patients with atrial–esophageal fistula formation after ablation procedures (Table 1). The patients were treated at centers and by physicians with a wide range of case volumes and experience (Table 2). Seven patients presented to their primary care physician, emergency department, or cardiologist before hospitalization with nonspecific symptoms. Presentations occurred within about 2 weeks of the ablation procedures (mean, 12 days [range, 10 to 16 days]).

Patients presented with general malaise, leukocytosis, and persistent fever of undetermined origin. One patient who was admitted with persistent bacteremia had blood cultures that showed multiple bacterial species, including *α*-streptococcus, micrococcus, and *Candida albicans*. All

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Context

Cardiologists sometimes use catheter radiofrequency ablation procedures near the posterior wall of the left atrium to cure atrial fibrillation.

Contribution

This retrospective case series describes 9 patients with atrial–esophageal fistulas following catheter ablation for atrial fibrillation. They presented 10 to 16 days after the procedure with nonspecific findings, such as fever, leukocytosis, and neurologic abnormalities. All died. Only 4 received correct diagnoses before death.

Cautions

Case reports cannot establish how often ablation-related atrial–esophageal fistulas occur.

Implications

Atrial–esophageal fistulas that occur after ablation procedures involving the left atrium may have an indolent yet ultimately catastrophic presentation.

—The Editors

patients developed septic shock and cardiovascular collapse.

Eight patients had neurologic findings consistent with multiple embolic strokes. Of these, 2 had intravascular air on computed tomography. Six patients had transesophageal echocardiography that yielded findings consistent with endocarditis. One of the echocardiograms showed evidence of vegetation or possible food particulate originating from the posterior wall of the left atrium. Two patients presented with symptoms consistent with transient angina associated with ST-segment elevation on electrocardiography. Three patients reported substantial gastrointestinal bleeding, but 5 patients had occult bleeding documented by fecal testing.

All 9 patients died. Four patients received diagnoses of atrial–esophageal fistula before death. Only 4 patients had

Figure. Three-dimensional computed tomographic reconstruction of the left atrium in relation to the esophagus.

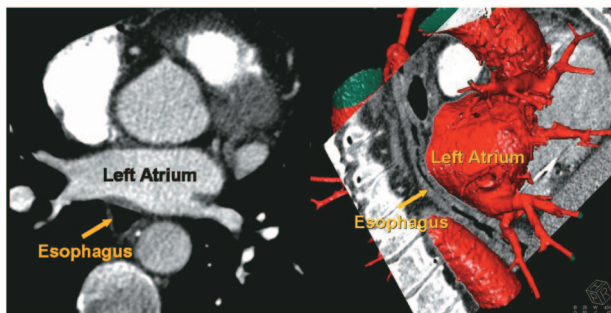


Table 1. Characteristics of Patients

Characteristic	Value
Male sex, <i>n</i>	4
Mean time to presentation (range), <i>d</i>	12.3 (10–16)
Deaths, <i>n/n</i>	9/9
Presenting symptoms, <i>n/n</i>	
Sepsis	9/9
Neurologic symptoms	8/9
Myocardial infarction or ischemia	2/9
Overt gastrointestinal bleeding	3/9
Computed tomography performed, <i>n/n</i>	4/9
Diagnosis by computed tomography, <i>n/n</i>	3/4
Diagnosis confirmed by autopsy, <i>n/n</i>	9/9
Diagnosis only by autopsy, <i>n/n</i>	6/9

computed tomography, which identified the atrial–esophageal fistula in 3 patients. The remaining fistulas were diagnosed at autopsy. Of the 4 patients who received correct diagnoses before death, 3 had surgery and 1 died before surgery could be performed. All patients underwent autopsy, which confirmed or provided the diagnosis of atrial–esophageal fistula.

DISCUSSION

Esophageal damage, perforation, and atrial–esophageal fistulas were first described after posterior left atrial radiofrequency ablation performed during open-heart surgery. Atrial–esophageal fistulas were diagnosed during postoperative days 5 to 7 (5). Patients presented with neurologic deficits from air emboli, massive gastrointestinal bleeding, and septic shock (6). The first descriptions in the medical literature of atrial–esophageal fistula formation after percutaneous radiofrequency catheter ablation, including 3 cases from experienced centers, were published in 2004 (3, 4). The patients in the published cases presented with signs and symptoms similar to those reported in this case series. All patients presented with nonspecific signs and symptoms, such as dysphagia, odynophagia, intermittent cardiac or neurologic ischemia (air emboli, vegetation, or both), persistent fever, bacteremia, fungemia, and melena. All patients presented to their physicians, often several times, with this constellation of symptoms in the weeks after their ablation procedure. Esophageal damage resulting from the previous ablation procedure was not considered in the differential diagnosis.

Although atrial–esophageal fistula formation is apparently rare, it seems to almost always be fatal. Therefore, evaluation and management of patients presenting with this potential complication must focus on rapid diagnosis and triage. Fever, malaise, leukocytosis, dysphagia, and neurologic symptoms in patients with a recent catheter ablation procedure should raise suspicion of atrial–esophageal fistula. Computed tomography of the chest or head may reveal intravascular air. Air localized to the intravascular space may arise from a communication between the gastrointestinal tract and the vasculature, and atrial–esoph-

Table 2. Atrial Fibrillation Ablations Performed Annually at Each of the Centers Reporting a Case of Atrial–Esophageal Fistula

Case-Patient with Atrial–Esophageal Fistula	Annual Reported Volume of Atrial Fibrillation Ablation Cases at Treating Center, n/y
1	<100
2	>300
3	100–150
4	<100
5	>300
6	200–250
7	>300
8	<100
9	100–150

ageal fistula must be considered. Of note, endoscopy with insufflation of the esophagus should be avoided to prevent further air embolism. Although all 9 patients in our series died, a previously published report documented survival after rapid surgical correction (4). Therefore, survival may depend on rapid diagnosis and prompt surgical intervention.

Retrospective case series based on anonymous identification of cases and retrospective medical record review have several limitations. Although anonymous identification of cases facilitates the reporting of data on poor outcomes, lack of systematic monitoring across many physicians and procedures prevents assessment of the incidence of complications. Some relevant clinical information may not have been recorded in medical records, and patients did not receive uniform follow-up and work-up for complications after their ablation procedures.

In conclusion, left atrial–esophageal fistula formation is a rare but frequently fatal complication of radiofrequency catheter ablation for atrial fibrillation. Physicians must have a high index of suspicion for this complication in patients recently undergoing catheter ablation and presenting with the constellation of symptoms described in this report. Awareness of this potential complication is par-

ticularly important for primary care physicians and emergency department physicians, because rapid diagnosis and appropriate triage of affected patients may be crucial to survival. Early surgical intervention seems to be the best opportunity to improve survival. Further research is needed to determine effective strategies to avoid esophageal injury during catheter ablation procedures.

From The Cleveland Clinic, Cleveland, Ohio, and Hospital Pró-Cardíaco, Rio de Janeiro, Brazil.

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Requests for Single Reprints: Jennifer E. Cummings, MD, Department of Cardiovascular Medicine, Section of Electrophysiology and Pacing, 9500 Euclid Avenue Desk F-15, Cleveland, OH 44195.

Current author addresses and author contributions are available at www.annals.org.

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Current Author Addresses: Drs. Cummings, Schweikert, Saliba, Burkhardt, Kilikaslan, and Natale: Department of Cardiovascular Medicine, Section of Electrophysiology and Pacing, 9500 Euclid Avenue Desk F-15, Cleveland, OH 44195.

Dr. Saad: Hospital Pró-Cardíaco, 2607/303 Avenida Borges de Medeiros, 22470-001 Rio de Janeiro, Brazil.

Author Contributions: Conception and design: J.E. Cummings, F. Kilikaslan, E. Saad, A. Natale.

Analysis and interpretation of the data: J.E. Cummings, R.A. Schweikert, A. Natale.

Drafting of the article: J.E. Cummings, R.A. Schweikert, J.D. Burkhardt, F. Kilikaslan, A. Natale.

Critical revision of the article for important intellectual content: J.E. Cummings, R.A. Schweikert, W.I. Saliba, J.D. Burkhardt, E. Saad, A. Natale.

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