

CASE REPORT

ADVANCED

CLINICAL CASE

Esophagopericardial Fistula Following Radiofrequency Ablation for Atrial Fibrillation



Insights Into Its Management

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ABSTRACT

An esophagopericardial fistula developed in a 33-year-old patient after radiofrequency ablation for atrial fibrillation. He was initially managed with an esophageal repair and a left atrial bovine pericardial patch and eventually an esophagectomy. At 6-month follow up he had no symptoms. The case highlights the complexities of managing this life-threatening complication. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2021;3:1132-5) Crown Copyright © 2021 Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

HISTORY OF PRESENTATION

A 33-year-old man presented to our emergency department (Department of Cardiology and Cardio-

thoracic Surgery, Canterbury District Health Board, Christchurch, New Zealand) with severe pleuritic chest pain, dyspnea, fever, and pre-syncope. He had undergone elective radiofrequency ablation (RFA) for atrial fibrillation (AF) 18 days earlier in another institution. This previous procedure was performed with a 4-mm irrigated RFA catheter using 30 W at 20 to 30 seconds per lesion on the posterior wall and consisted of wide pulmonary vein isolation and posterior wall isolation using a box line set. Saline irrigation was used, and esophageal temperature monitoring was not used. No complications had been observed immediately following this procedure. On examination, he was unwell, tachycardic, and unable to lie flat.

LEARNING OBJECTIVES

- To recognize that pericardioesophageal fistula as a rare but life-threatening complication of AF ablation.
- To be able to 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.
- To understand that although there is general agreement that early surgical intervention results in the best outcomes for atrioesophageal fistula, the optimal management for esophagopericardial fistula has not been defined.

PAST MEDICAL HISTORY

He had a background of hypertrophic cardiomyopathy but was otherwise well.

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DIFFERENTIAL DIAGNOSIS

The differential diagnosis in this case included pneumonia, worsening cardiomyopathy, pericarditis, and esophagopericardial fistula.

INVESTIGATIONS

Diagnostic tests included a blood count with leukocytosis with white blood cell count of 26 cells/L (normal range 4 to 11); C-reactive protein of 100 mg/L (normal <5 mg/L). An electrocardiogram showed global ST-segment elevation and PR interval depression, suggesting pericarditis (Figure 1). The chest radiograph showed evidence of pneumopericardium (Figure 2). A transthoracic echocardiogram showed normal left ventricular size and function, with a 1-cm pericardial effusion with no evidence of tamponade. Computed tomography (CT) of the chest with an oral contrast agent revealed an esophageal perforation communicating with the pericardial space and extraluminal oral contrast material tracking between the esophagus and the pericardium posterior to the left atrium (Figure 3).

MANAGEMENT

A provisional diagnosis of atrioesophageal perforation was made, and the patient underwent emergency surgery on the day of admission. Initially, a

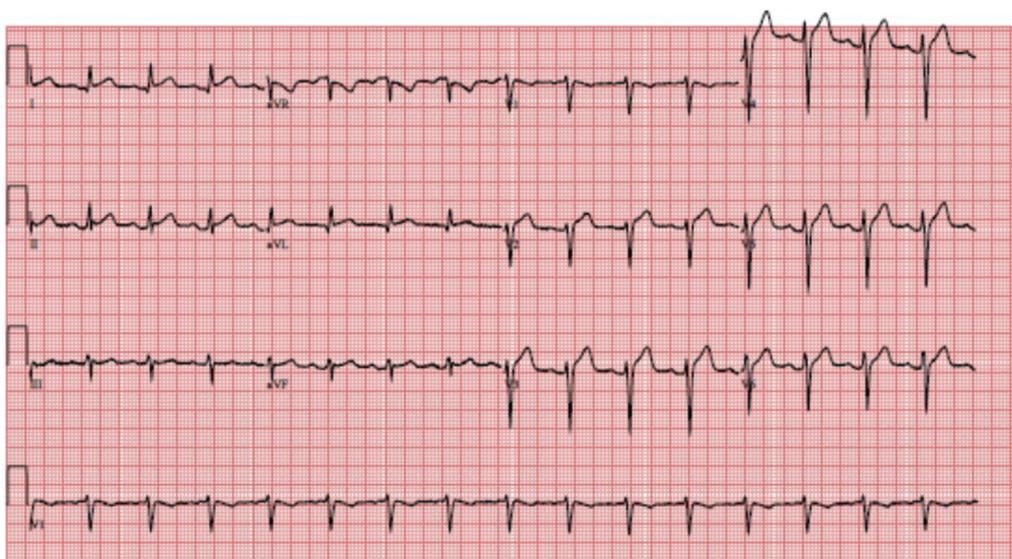
sternotomy was performed, revealing pericardial tamponade with gastric fluid and an intact left ventricular posterior wall. The pericardium was washed out, and because of uncertainty regarding the integrity of the posterior left atrial wall, the patient was placed on cardiopulmonary bypass. Inspection of the interior of the left atrium revealed hemorrhagic tissue but without clear perforation. Because we were unable to access the extent of intramural burn, a bovine pericardial patch was placed to reinforce the posterior wall of left atrium. After closure of the sternotomy, the patient was turned in a lateral position, and a right thoracotomy was performed to give optimal esophageal exposure. The midthoracic esophagus contained dense inflammatory adhesions with a 1.5-cm anterior perforation, which was oversewn.

The patient had a prolonged hospital stay and received multiple courses of antibiotics and anti-fungal agents. On postoperative day 7, an esophageal leak and right empyema developed, and he underwent operative drainage of the empyema, esophageal endoscopy, and placement of an esophageal stent over the recurrent fistula (Figures 4A and 4B). On day 15, he had evidence of an esophageal leak on CT that was managed conservatively. On day 46, the esophageal stent was removed, and there was evidence of the healed original fistula. However, there was a new

ABBREVIATIONS AND ACRONYMS

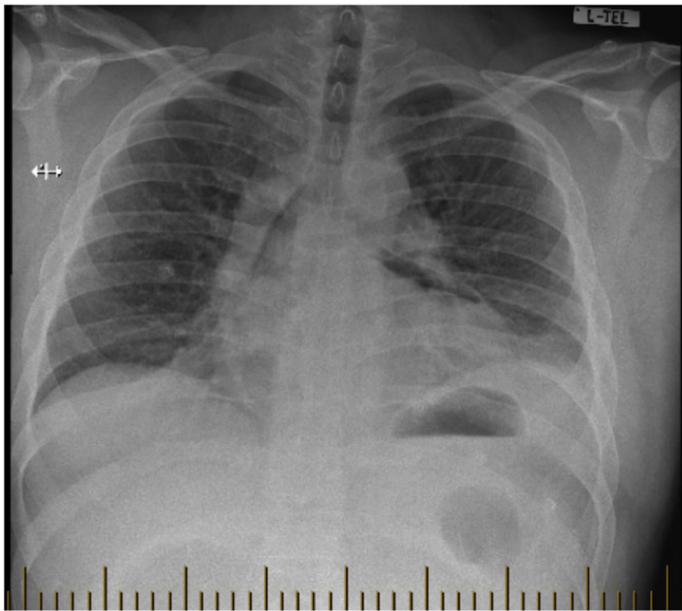
- AF = atrial fibrillation
- CT = computed tomography
- RFA = radiofrequency ablation

FIGURE 1 Electrocardiogram on Admission



The electrocardiogram shows widespread ST-segment elevation in a pericarditis pattern.

FIGURE 2 Chest Radiograph on Admission

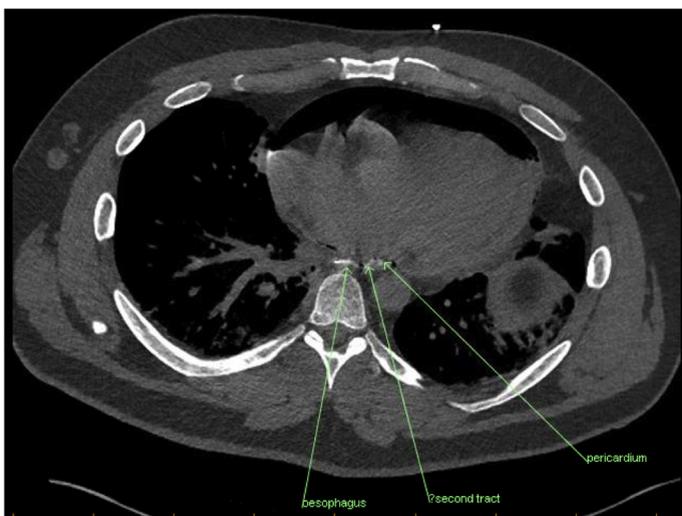


Chest radiograph shows pneumopericardium and a left-sided small pleural effusion.

esophageal fistula that had resulted from erosion of the pleural drain that was endoscopically clipped.

On day 78, he had radiological evidence of a persisting esophagopericardial fistula, and hence an

FIGURE 3 Computed Tomography on Admission



Oral contrast-enhanced chest computed tomography at the index presentation. Contrast material within the esophagus and pericardial sac is demonstrated, as well as large pneumopericardium.

esophagectomy was indicated. Access was through a left thoracoabdominal incision through the seventh intercostal space. The gastric conduit was brought up into the chest and anastomosed to the esophagus just above the arch of aorta. On day 97, he was able to be discharged. During his prolonged post-operative stay, he was treated with appropriate multiple antibiotics and antifungal drugs.

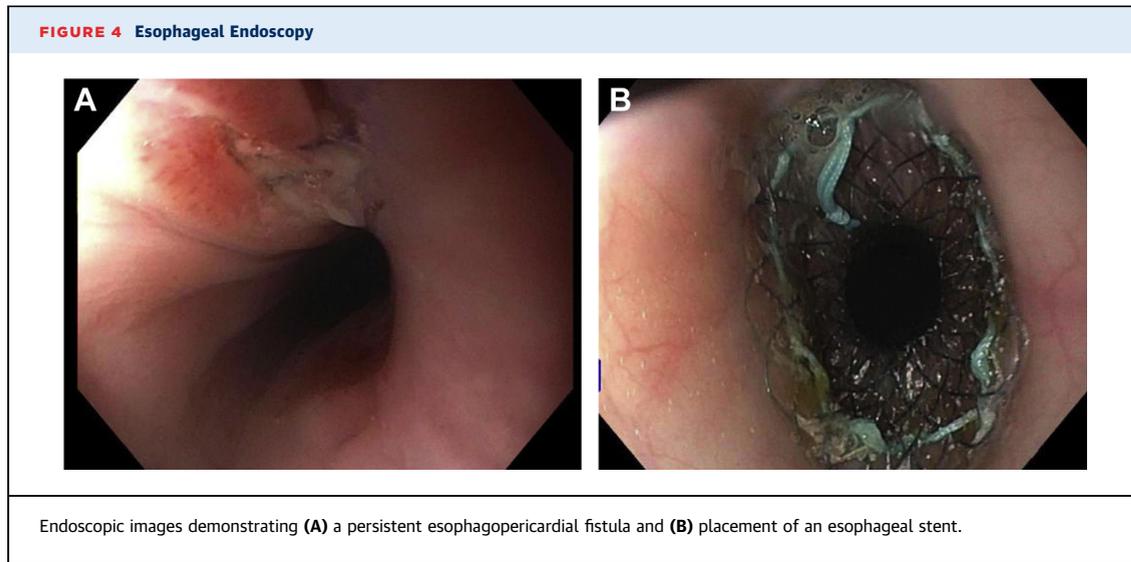
DISCUSSION

AF is the most common sustained heart rhythm disorder in clinical practice worldwide. Catheter-based ablation procedures are increasingly becoming the standard of care for drug-refractory symptomatic AF (1). Esophageal injury and subsequent perforation are rare but well-recognized complications of RFA for AF (2-5). The mechanism of the injury is likely esophageal thermal injury compounded by additional factors, such as ischemic injury, acid reflux, and infection (6).

A review by Han et al. (5) of this complication identified 120 cases with a mortality of 55%. In this review, most fistulas were between the esophagus and the left atrium (atrioesophageal fistula). However, 8 of the 120 cases were like that in our patient: fistulas between the esophagus and the pericardium only (esophagopericardial fistula) (5). It is unclear why RFA delivered in the left atrium can cause thermal damage and perforation of the esophagus without fistula formation through the posterior left atrium. The fistula appears to start first in the esophagus and progress toward the left atrium and pericardium (6,7). Furthermore, it is possible that patients with esophagopericardial fistula are at risk of progression to atrioesophageal fistula, as demonstrated by Zhang et al. (8). In our patient, because of the evidence of hemorrhagic damage to the posterior left atrium, we elected to patch the posterior left atrium to reduce the risk of subsequent perforation, an approach that has not been reported in other cases of esophagopericardial fistula.

However, the natural history of esophagopericardial fistulas does appear different from that of atrioesophageal fistulas with a lower mortality. In addition to the 8 cases in the review by Han et al. (5) and our case, we identified a further 8 case reports, for a total of 17 reported cases. There was only 1 death in these 17 patients, thus giving a mortality of 6%, much lower than the mortality for atrioesophageal fistula.

Although there is general agreement that early surgical intervention results in the best outcomes for atrioesophageal fistula (5), the optimal management for esophagopericardial fistula has not been defined.



The reported cases have been successfully managed with medical therapy, esophageal stenting, and surgical repair of the esophagus (8).

FOLLOW-UP

At 15 months, empyema requiring surgical drainage developed in our patient. He also had *Candida* and *Lactobacillus* sepsis and pericarditis and was treated with multiple antibiotic and antifungal agents. He has since recovered well, and at 2-year follow-up he remains well and has returned to full-time employment.

CONCLUSIONS

Our case highlights the difficulties in managing these patients. Despite early surgical intervention and

subsequent placement of an esophageal stent, the fistula failed to heal, and he ultimately required esophagectomy. This is now the second patient with an esophagopericardial fistula who has required an esophagectomy for persisting esophageal leak, and the other reported patient had a similarly protracted hospital course (9).

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The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS atrial fibrillation ablation, atrioesophageal fistula, esophagopericardial fistula