

# Atrial Fibrillation Following Esophageal Stent Placement: A Rare but Important Complication to Recognize

Seyedbabak Mirminachi, MD<sup>1</sup>, Ibrahim Yaghnani, MD<sup>2</sup>, Samer Muallem, MD<sup>3</sup>, and Hadie Razjouyan, MD, MPH (Epi)<sup>2</sup>

<sup>1</sup>Department of Internal Medicine, UPMC Harrisburg, Harrisburg, PA

<sup>2</sup>Division of Gastroenterology and Hepatology, Penn State University, Hershey, PA

<sup>3</sup>Department of Cardiology, Penn State S. Hershey Medical Center, Hershey, PA

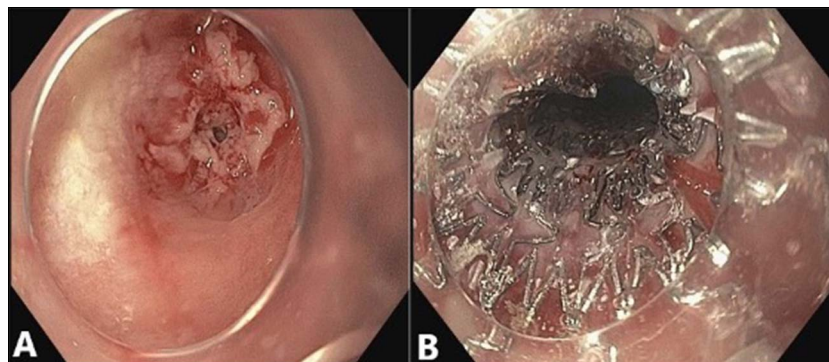
## ABSTRACT

There is a risk of new-onset atrial fibrillation (AF) in patients with esophageal cancer treated with neoadjuvant chemotherapy/radiotherapy followed by esophagectomy. However, the occurrence of AF after stent placement for esophageal cancer is less explored. Here, we present a case of esophageal cancer where AF developed poststent placement. The potential mechanisms linking stent placement and atrial dysrhythmias may involve left atrial compression and epicardial irritation. It is essential to remain vigilant about this arrhythmia following stent placement to promptly identify any early signs of atrial dysrhythmias, particularly given the frequently observed hypercoagulable state in these individuals.

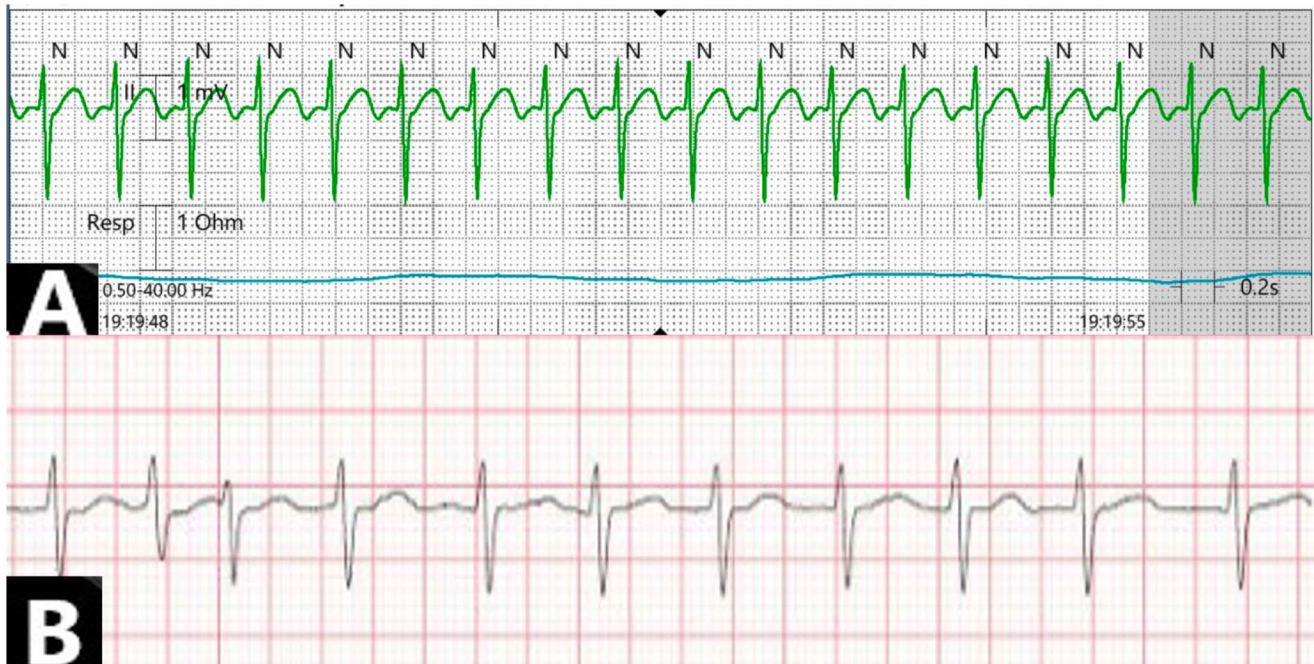
**KEYWORDS:** esophageal cancer; atrial fibrillation; stent placement

## INTRODUCTION

Esophageal cancer is the eighth most common cancer and the sixth most common cause of death worldwide.<sup>1</sup> The annual incidence of esophageal cancer is 21,000 cases in the United States, which causes 16,000 deaths.<sup>2</sup> Patients with locally advanced esophageal cancer who undergo neoadjuvant chemo/radiotherapy followed by esophagectomy have a risk of developing new-onset atrial fibrillation (AF), which occurs in 12%–37% of patients.<sup>3</sup> Developing AF after stent placement for esophageal cancer, however, is not as well studied.



**Figure 1.** (A) Fungating mass obstructing the esophageal lumen, with a pinhole causing significant dysphagia and weight loss. (B) The esophagus expanded after placement of an esophageal stent.



**Figure 2.** (A) Representative sample of telemetry strips demonstrating atrial fibrillation with rapid ventricular rate and (B) showing lead II of the patient's electrocardiogram while in atrial fibrillation.

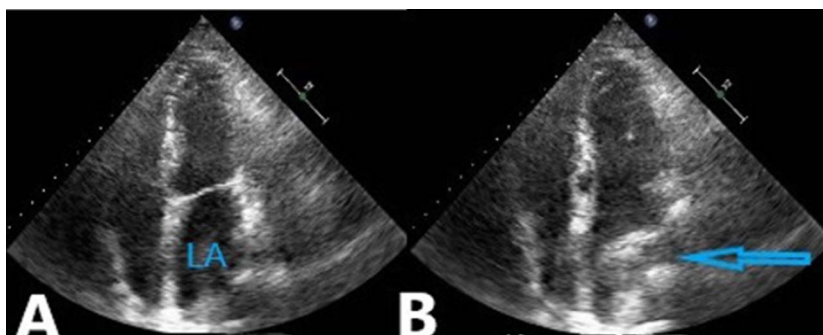
AF is the most common sustained cardiac arrhythmia marked by erratic and rapid activation of the atria, resulting in an irregular ventricular rhythm. One mechanism that could explain AF following esophageal stent placement is the external compression of the left atrium. A similar concept has been reported in patients with achalasia,<sup>4</sup> esophageal mass,<sup>5</sup> bronchogenic cyst,<sup>6</sup> and diaphragmatic hernia<sup>7</sup> as case reports.

Here, we describe a patient with esophageal cancer who developed AF after undergoing stent placement; subsequently, the AF resolved following the removal of the stent.

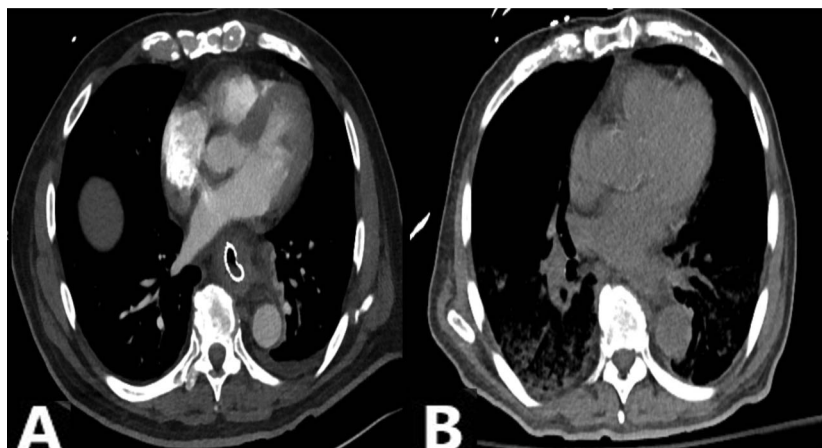
## CASE REPORT

The patient is a 75-year-old man with a history of long-standing gastroesophageal reflux disease and a hiatal hernia who presented with significant unintentional weight loss over several

months associated with worsening dysphagia to both solid and liquid as well as hematemesis. He denied having chest pain, shortness of breath, nausea or vomiting, or a change in bowel movements. Esophagogastroduodenoscopy was done demonstrating a large ulcerating mass with bleeding (Figure 1). The mass was partially obstructing and circumferential involving the entire lumen. Pathology report showed high-grade glandular dysplasia, suspicious for intramucosal adenocarcinoma. Nodal involvement was ruled out by positron emission tomography-computed tomography scan and endoscopic ultrasound and staged as T3N0M0. Considering the patient's presentation with dysphagia and hematemesis, stent placement was considered a favorable option to address the near-complete obstruction of the esophagus and prevent bleeding from the friable mucosa. Subsequently, he underwent repeat esophagogastroduodenoscopy, and a 19 mm diameter fully covered metal wall stent (19 mm × 100 mm EndoMAXX) was placed



**Figure 3.** (A) The apical view of the left ventricle and left atrium during the high-pressure end-systole cycle, and (B) a view of the left ventricle and partial collapse (blue arrow) of the left atrium during the lower pressure diastole cycle, when external pressure from the esophageal mass with stent is greater than the left atrial pressure.



**Figure 4.** (A) Stent/mass causing extrinsic compression of the left atrium. (B) Axial computed tomography showing normal relaxation of the left atrium after the esophageal stent was removed.

(Figure 1) to alleviate the obstruction. The following day, the patient developed sinus tachycardia. Two days after the procedure, arrhythmia was noted on telemetry and his echocardiogram indicated AF with rapid ventricular response, which was refractory to beta-blocker therapy (Figure 2). The workup to find the underlying cause of this arrhythmia included checking thyroid-stimulating hormone and troponin, which were normal. Transthoracic echocardiogram (Figure 3) revealed a normal ejection fraction (65%–70%) with compression of left atrium during diastole. Computed tomography chest angiogram showed no evidence of pulmonary embolism but did demonstrate compression of the stented esophagus against the left atrium (Figure 4). Reviewing the computed tomography abdomen pelvis obtained 1 day before esophageal stent placement did not reveal the proximity between the esophageal mass and the left atrium. Rhythm control was ultimately achieved in this patient with an amiodarone drip. Therefore, the decision was made to retain the stent to continue alleviating dysphagia, secure enteral nutrition while he was completing his chemoradiation therapy. The patient was discharged on oral amiodarone and apixaban.

The stent was removed 2 months later due to the patient receiving additional radiation therapy during this period, resulting in tumor shrinkage. Following stent removal, amiodarone was tapered off by Cardiology department and patient's heart rhythm remained normal.

However, the patient developed a radiation stricture later following chemoradiation. As a result, he had recurrent dysphagia, which necessitated dilation and esophageal stent placement. Notably, this time, he did not develop poststent AF.

## DISCUSSION

Iatrogenic induction of atrial dysrhythmia by esophageal stenting has been reported 2 times in the literature. The first case was a 36-year-old man with stage IVa esophageal squamous cell

carcinoma who developed narrow complex regular tachycardia following the placement of 2 esophageal stents. The sinus rhythm was achieved by adenosine and beta-blocker treatment. The atrial dysrhythmia resolved following salvage esophagectomy, including removal of the stents.<sup>8</sup> The second case was a 75-year-old man with stenotic lower third esophageal cancer who was incidentally diagnosed with AF during the palliative endoscopic dilatation procedure and sinus rhythm achieved by intravenous administration of amiodarone.<sup>9</sup>

Esophageal stenting for palliating dysphagia is indicated in patients with surgically incurable cancer or individuals who cannot tolerate surgery or chemoradiotherapy. Atrial dysrhythmia is a rare and poorly understood complication following esophageal stent placement, which can significantly affect their management, including morbidity and mortality. Left atrial compression and epicardial irritation could be a possible mechanism to explain the association between stent placement and atrial dysrhythmias. It is crucial to be aware of the possibility of this arrhythmia after stent placement to detect any signs of atrial dysrhythmia early, especially given the hypercoagulable state commonly observed in these individuals.

The fact that the patient did not develop poststent AF following radiation stricture further supports our hypothesis that this particular arrhythmia developed secondary to the mass expanded by stent causing extrinsic compression against the left atrium.

## DISCLOSURES

Author contributions: S. Mirminachi: study concept and design, acquisition of data, drafting of the manuscript. I. Yagham: acquisition of data, drafting of the manuscript, critical revision of the manuscript for important intellectual content. S. Muallem and H. Razjouyan: study concept and design, critical revision of the manuscript for important intellectual content. H. Razjouyan is the article guarantor.

Financial disclosure: None to report.

Informed consent was obtained for this case report.

Received February 21, 2024; Accepted May 23, 2024

## REFERENCES

1. Napier KJ, Scheerer M, Misra S. Esophageal cancer: A review of epidemiology, pathogenesis, staging workup and treatment modalities. *World J Gastrointest Oncol.* 2014;6(5):112–20.
2. Siegel RL, Miller KD, Wagle NS, Jemal A. Cancer statistics, 2023. *CA Cancer J Clin.* 2023;73(1):17–48.
3. Seesing MFJ, Borggreve AS, Ruurda JP, van Hillegersberg R. New-onset atrial fibrillation after esophagectomy for cancer. *J Thorac Dis.* 2019;11(Suppl 5):S831–4.
4. Upile T, Jerjes W, El Maayah M, Singh S, Hopper C, Mahil J. Reversible atrial fibrillation secondary to a mega-oesophagus. *BMC Ear Nose Throat Disord.* 2006;6:15.
5. Bayraktar UD, Dufresne A, Bayraktar S, Purcell RR, Ajah OI. Esophageal cancer presenting with atrial fibrillation: A case report. *J Med Case Rep.* 2008;2:292.
6. Volpi A, Cavalli A, Maggioni AP, Pieri-Nerli F. Left atrial compression by a mediastinal bronchogenic cyst presenting with paroxysmal atrial fibrillation. *Thorax.* 1988;43(3):216–7.
7. Siu CW, Jim MH, Ho HH, et al. Recurrent acute heart failure caused by sliding hiatus hernia. *Postgrad Med J.* 2005;81(954):268–9.
8. Mazzella AJ, Fried AJ, Hicks C. Atrial dysrhythmias due to extrinsic left atrial compression by an esophageal stent. *HeartRhythm Case Rep.* 2021;7(4):216–9.
9. Lamblin A, Turc J, Wey PF, et al. An unusual cause of rapid atrial fibrillation. *Can J Anaesth.* 2013;60(5):500–1.

---

**Copyright:** © 2024 The Author(s). Published by Wolters Kluwer Health, Inc. on behalf of The American College of Gastroenterology. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.