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Esophageal ulcer following cryoablation for atrial fibrillation

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Abstract

Atrial fibrillation is a common arrythmia. Treatment is multi-modal including medical management and more aggressive treatment including surgery and radiofrequency ablation.

We report here a case of a 55 year old man who developed an esophageal ulcer related to treatment of atrial fibrillation by cryoablation. This complication is common although asymptomatic in the majority of cases. It may develop into esophageoatrial fistula resulting in mortality.

Physicians need to be aware of this complication and there is a need to explore ways of preventing and diagnosing the esophageal complications of ablation treatment of atrial fibrillation.

Keywords: Atrial fibrillation; Cryoablation; Esophageal ulcer; Complications.

Abbreviations: AF: Atrial Fibrillation; RFA: Radiofrequency Ablation.

Introduction

Atrial Fibrillation (AF) is a global health care problem with evidence suggesting an increasing prevalence and incidence worldwide [1-3]. A systematic review of worldwide population-based studies (n=184) estimated that the number of individuals with AF in 2010 was 33.5 million. The treatment of AF includes either rate control or rhythm control [4].

Radiofrequency ablation is an effective therapy for patients with severely symptomatic atrial fibrillation that is refractory to medication. This may result in an esophageal injury as a direct consequence of ablation along the posterior wall of the left atrium, which lies in proximity to the esophagus as it courses through the thoracic cavity. This injury may range from an ulcer to a fistula between the esophagus and the left atrium. Most of the reports of esophageal injurious have related to thermal or radiofrequency ablation and there are less reports of injuries associated with cryoablation.

Case report

A 55 year old man with a history of paroxysmal atrial fibrillation was treated by endovascular cryoablation. His regular medications included apixaban bisoprolol and alfuzosin. Four pulmonary veins were isolated by use of cryoablation and the desired temperature was achieved. Three weeks after having the procedure performed he developed dysphagia and odynophagia for solids. He did not receive any anti-acid medication. Two months later he was referred to our unit since his complaints had not resolved. Treatment with lansoprazole was commenced and his complaints and he was asymptomatic after 2 weeks of treatment. After 6 weeks an upper GI endoscopy revealed a Forrest's grade 3 ulcer of 9 mm diameter just above the z line.

Discussion

We present a case of an esophageal ulcer developing after cryoablation for atrial fibrillation. The esophageal wall is adjacent to the left atrium, especially the posterior wall and the pulmonary vein ostia which makes it vulnerable to thermal energy.

A study by Halm et al. [5] where all patients undergoing RFA underwent gastroscopy provides useful clinical data. A total of 185 patients who were treated with left atrial RFA underwent gastroscopy between 24 to 49 hours after the procedure. None of the patients experienced thoracic discomfort, such as retrosternal pain, dysphagia or odynophagia. In addition, all patients who underwent RFA were treated with esomeprazole 40 mg once daily for four weeks following the ablation. Localized ulcer-like lesions in the esophagus were detected in 27 of 185 patients (14.6%). The lesions ranged in size from 2-16 mm and were located between 25 to 35 cm from the teeth. Fifteen of the patients (8%) had lesions greater than 5 mm. In this study the maximal temperature produced was higher (42.6+1.7^{0}C) in those patients with esophageal damage as compared to those without esophageal lesions. All the patients with with esophageal lesions experienced an intraluminal esophageal temperature of at least 41^{0}C.

Fifteen patients had lesions greater than 5 mm and 14 underwent repeat gastroscopy 3 days after the initial procedure. There was a decrease in size from 8.6 to 5 mm and there were no instances of an atrio-esophageal fistulae.

Interestingly, in this study none of the 27 patients with esophageal ulcers following ablation had clinical complaints of retrosternal pain, dysphasia, or odynophagia. This occurred despite all patients receding 40 mg of esomeprazole for 4 weeks after the procedure.

Our patient was treated by cryoablation. Cryoablation may cause damage to the bronchi, phrenic nerve and esophagus. The esophageal temperature decreases during the procedure and one estimate is a rate of esophageal damage of 12% [6]. The vagal plexus damage has been reported to be associated with gastroparesis [7,8]. In a study performed on sheep endocardial and epicardial cryoablation produced mild esophageal damage in 2/6 cases, and moderate and severe lesions in 1/6. Two other cases had no esophageal damage [9]. A review of the complications of cryotherapy found gastroparesis with 3.2% of patients having symptoms suggestive of gastroparesis but without any manometry studies [7].

Our patient developed complaints three weeks after the procedure. Unfortunately, gastroscopy was not performed on him until several weeks after the procedure.

Physicians need to be aware of the possibility of esophageal injury post-ablation, especially with RFA. The absence of symptoms in no way excludes esophageal injury. If patients were to have their anti-coagulant treatment restarted after the procedure there could be episodes of GI bleeding. Further study is required to determine the incidence of esophageal complications post-ablation, which factors are predictive of esophageal injury with current treatment techniques that have evolved over the last decade and the best method for prevention.

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