

Atrial Fibrillation Following Peroral Endoscopic Myotomy

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ABSTRACT

Atrial Fibrillation (AF), Post-Peroral Endoscopic Myotomy (POEM) for achalasia is a concern due to the potential implications on patient safety and outcome. While POEM is an effective treatment, emerging evidence suggests an association with AF with hypothetical origin reasons as factors like vagal nerve stimulation or electrolyte imbalances. Further research is needed to clarify mechanisms and optimize perioperative strategies to prevent AF.

Keywords: Atrial fibrillation; Anticoagulation therapy; Post-peroral endoscopic myotomy; Antithrombotics

INTRODUCTION

Atrial Fibrillation (AF) is a common cardiac arrhythmia characterized by ineffective atrial contraction and an increased risk of stroke, heart failure, and mortality [1]. Recent studies have identified a potential link between AF Post-Peroral Endoscopic Myotomy (POEM), a minimally invasive treatment for achalasia [2-9]. POEM surgery, introduced by Inoue in 2010, revolutionized the management of achalasia and the procedure involves creating a submucosal tunnel in the esophagus and performing myotomy of the inner circular muscle layer to improve esophageal emptying and alleviate dysphagia [10]. While POEM is generally considered safe and effective, emerging evidence suggest cases of AF occurring intraoperatively or in the postoperative period following POEM procedures. The exact mechanisms still remain unclear but may involve vagal nerve stimulation, electrolyte disturbances, or transient inflammation affecting the cardiac conduction system [11].

The onset of AF following POEM surgery poses clinical challenges, including the need for vigilant monitoring, timely intervention, and appropriate management of anticoagulation therapy to mitigate the risk of thromboembolic events [11]. Additionally, healthcare providers should consider preoperative risk stratification and optimization of modifiable risk factors to minimize the likelihood of POAF [12].

Our study aims to perpetuate further researches to elucidate the underlying mechanisms and risk factors predisposing patients to post-POEM atrial fibrillation for guiding perioperative strategies to enhance patient safety and outcomes.

RECENT FINDINGS

Through meticulous database search for research assessing AF rates Post-POEM, the following articles and their relevant findings has been concluded to achieve an overall understanding on the study topic. The postoperative period in majority of surgical case carries a high risk for atrial fibrillation, potentially leading to adverse health outcomes, prolonged duration and cost of hospital stay [2]. POEM is an entirely endoscopic approach for the treatment of achalasia and other esophageal dysmotility disorders, which has been shown to be safe and effective with a low incidence of reported complications [3]. However, POAF is shown to occur in up to 10%-20% of noncardiac thoracic surgery, with onset typically 2-4 days postoperatively [2]. POAF as a complication of POEM remains poorly understood, hence we find the need to thoroughly review the existing literature to further understand the scope of future studies.

A case of a patient that underwent POEM reported new onset postoperative atrial fibrillation following development of a large mediastinal hematoma [3]. The patient was initially discharged uneventfully on post operative day 2 but presented again to the emergency department on day 19 with fatigue, weakness, and chest discomfort, when Electrocardiogram (ECG) revealed the rhythm abnormality. A CT showed a fluid filled collection, which was suspected of having compressed the left atrium, thus stretching the pulmonary veins. Esophagogastroduodenoscopy (EGD) however showed intact mucosa and no evidence of mass effect. It was then managed with a low dose beta blocker.

Another study assessing the safety and efficacy of POEM in patients on antiplatelets and antithrombotics, where 20 of 126

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cases had pre-existing atrial fibrillation as an indication, concluded that POEM is safe and effective in patients on anticoagulant or antiplatelet therapy [4]. However, the risk of experiencing major bleeding was approximately 5%, which is significantly higher than in patients not receiving antithrombotic therapy. Atrial fibrillation was not reported as a postoperative adverse event.

A study from 2021 conducted in Australia, reported experiencing minor adverse events (8%), including intramural esophageal leak requiring re-clipping, atrial fibrillation, fluid overload, urinary retention, and fever without evidence of mediastinitis or peritonitis. Factors associated with adverse events were being more than 60 years old (OR, 4.40; 95% CI, 1.44-13.5) and prior botulinum toxin injection (adjusted OR, 3.90, 95% CI, 1.25 -12.2) [5].

In an international multicentre study of adverse effects of G-POEM, of the 216 patients that underwent POEM, 31 reported adverse effects including 1 case of atrial fibrillation occurring after 48 hours, stabilized with IV diltiazem [6]. The study concluded that the safety of the procedure increases with the endoscopist's experience. Other factors that may possibly reduce the occurrence of AEs include longitudinal direction of mucosal incision, use of hook knife, and using clips for mucosal closure. Technical factors may also be a cause of Post-Operative Atrial Fibrillation (POAF) as demonstrated by another study assessing the cause of aborted POEMs, which concluded that out of the 13 failures, 12 (92.3%) were due to severe submucosal fibrosis, which precluded tunneling, and one (7.7%) was due to atrial fibrillation related to the electric current of the endoscopic knife [7].

A study which aimed to evaluate the value of routine CT esophagram on Postoperative Day (POD) 1 after POEM, revealed that of the 58 post-POEM CTs conducted, 57 (98%) showed at least one abnormal finding: pneumoperitoneum or retroperitoneal air (91%), pneumomediastinum (78%), pleural effusion (34%), pneumothorax (14%), pneumonia (7%), pericardial effusion (2%), and mediastinal collection (2%). The adverse effect involving pericardial effusion, presented in a 75 year old male and was associated with atrial fibrillation. Thus, pressure effect maybe be a common etiology for POAF, such as a mediastinal hematoma compressing the left atrium [3].

A multicenter retrospective study from South Korea that aimed to analyze various Adverse Events (AEs) related POEM their relations an extended hospital stay, concluded that there was no significant difference was observed between the delayed discharge group and the non-delayed group in patients characteristics, diagnosis, previous treatment, and characteristics related to the POEM procedure [8]. In a study by Ju Yup Lee, the adverse effects among patients undergoing POEM were studied. Out of 328 patients included in the study, 58 of them had previous coronary illnesses such as coronary heart disease, atrial fibrillation and congestive heart failure. Although, patient characteristics in this study included pre-existing atrial fibrillation, we cannot conclude how pre-existing atrial fibrillation specifically may influence postoperative outcomes due to lack of specific data [9].

CONCLUSION

Though POEM offers a promising treatment for esophageal dysmotility disorders, its association with Postoperative Atrial Fibrillation (POAF) remains inadequately understood. Various studies highlight instances of POAF following POEM, often linked to factors such as mediastinal hematoma or technical challenges during the procedure and the use of antithrombotic therapy presents complex considerations. Further research is required to demonstrate the relationship between POEM and POAF, as well as to identify strategies for risk mitigation. Factors like patient characteristics, procedural techniques, and postoperative monitoring are likely influential. As the field advances, more comprehensive studies are crucial for optimizing patient outcomes and enhancing the safety of POEM procedure.

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