



Research Brief

Triple gastrointestinal prophylactic therapy following high-power short-duration posterior left atrial wall ablation

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ABSTRACT

The purpose of this study is to investigate incidence of gastrointestinal symptoms and complications in patients who underwent high-power short-duration (HPSD), posterior left atrial wall isolation during atrial fibrillation ablation and thereafter have received gastrointestinal prophylactic regimen consisting of sucralfate, proton-pump inhibitor and colchicine. Patients were followed and assessed at baseline, up until 6th month following the procedures. Among 115 patients who were included, 5 patients (4.3%) reported gastrointestinal symptoms at follow-up. No complications were diagnosed during the follow-up. In conclusion, the HPSD along with prophylactic regimen has been associated with low incidence of gastrointestinal adverse events.

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1. Introduction

Atrial fibrillation (AF) ablation as an important treatment modality for both paroxysmal AF and persistent AF. Although pulmonary vein isolation (PVI) is the main target AF ablation, adjunctive ablation techniques such as cavotricuspid isthmus (CTI) ablation, posterior wall isolation (PWI) have been tested in various circumstances.¹ Intuitively, extensive ablation may be associated with an increase in incidence of complications, however, this has not been proven in a systematic review.² Moreover, even though observational data have demonstrated improvement in safety with contact force sensing technology, in a recent meta-analysis, analysis of randomized data has failed to demonstrate any favorable impact.³ One of the latest trends in AF ablation is high-power short-duration (HPSD) ablation, which aims to improve lesion transmural and durability, therefore improve outcomes.^{4,5} HPSD energy settings have varied between studies: starting from 45 up to 90Watts.^{6,7} Whether HPSD will improve PWI durability and therefore outcomes in patients undergoing empirical PWI is not known, and is currently being tested in an ongoing trial.

Injury of the esophagus, including hematoma, ulceration (EU), perforation (EP) and atrio-esophageal fistula (AEF), is a well-known complication of AF ablation.⁸ Due to anatomical neighborhood, esophagus is prone to thermal injury, as well as collateral vagal nerve injury and subsequent acid reflux.^{9,10} The most dreadful of

these complications, AEF, which may be underreported due to difficulty in diagnosis, has been reported to occur in 0.04% and 0.03% patients in two reports.^{11,12}

In this descriptive study, we aim to investigate the incidence of gastrointestinal adverse events (GIAE) (including both symptoms and complications) in patients who have received prophylactic post-procedure drug regimen consisting of sucralfate, proton-pump inhibitor (PPI) and colchicine (the triple regimen) after AF ablation incorporating high-power short duration (HPSD) posterior wall ablation.

2. Methods

2.1. Study population

The study population was drawn from patients undergoing AF ablation at a single university center, between January 2016 and January 2018. Patients received sucralfate suspension (1g q.i.d.), PPI (pantoprazole 40 mg b.i.d.) and colchicine (0.5 mg b.i.d. in patients ≥ 70 kg and 0.5 mg q.d. for < 70 kg) administered the night before the procedure and for two months thereafter. Patients with prior known upper gastrointestinal disease and/or symptoms were excluded from the study. The local ethical committee approved all the steps and procedures in the study.

2.2. Ablation procedure and follow-up

All patients underwent ablation-index guided (target of 550 for anterior locations, and 350 for posterior sites) wide area

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circumferential ablation for PVI, along with PWI by debulking with power settings 45 Watts and at least for 10 s. This power setting was used uniformly for all lesion sets, including in sites that were in anatomical neighborhood of the esophagus. Ablation was performed using contact-force sensing catheters (mainly SmartTouch SF, Biosense Webster, CA, US). Power delivery was stopped immediately when esophageal temperature rose rapidly by 1 °C or to a value greater than 38 °C. Additionally CTI line was ablated until bi-directional block was observed. We have performed routine HPSD PWI and CTI to investigate the hypothesis whether this technique improves outcomes irrespective of AF type. The efficacy of this technique will be published separately. Patients were followed and assessed for GIAE at baseline following the procedure, and regularly at 1st, 2nd, 3rd, and 6th month following the procedures. Symptoms due to known drug side-effects (mainly diarrhea due to colchicine) were not included in the results unless symptoms remained following discontinuation of the drug.

2.3. Statistical analysis

IBM SPSS Statistics (version 23, for Windows) was used for the statistical analyses. Continuous variables are expressed as the group mean \pm 1 SD.

3. Results

115 patients undergoing AF ablation were included in our study. All patients underwent PVI, PWI, CTI ablation. Mean age of the population was 57 ± 11.1 years, and 62 (53.9%) patients were female. Clinical characteristics of the study population are presented in Table 1.

5 patients (4.3%) within the study population reported dyspeptic symptoms (Table 2) and were evaluated by gastroenterology specialist. All symptoms occurred in the same day after the procedure or the day after. Mild dyspeptic symptoms resolved within 48 h of initiation of prophylactic regimen in four patients, however, one patient (0.8%) reported severe dyspeptic symptoms, and underwent diagnostic upper gastrointestinal endoscopy. Mucosal erythema was reported with no sign of esophageal ulceration or fistula. 5 patients discontinued colchicine due to diarrhea, due to a known side-effect. No patients were lost in follow-up.

4. Discussion

In this single-center observational study encompassing 115 patients who underwent extensive AF ablation including HPSD LA posterior wall ablation, the incidence of gastrointestinal symptoms was low, and no complication observed.

Table 1
Clinical characteristics of study population.

Atrial Fibrillation (AF) – no. (%)	
Total	115 (100)
Persistent	28 (24.3)
Paroxysmal	87 (75.7)
Sex – no. (%)	
Male	53 (46.1)
Female	62 (53.9)
Age – yr	57 ± 11.1
Hypertension – no. (%)	64 (55.7)
Diabetes Mellitus – no. (%)	17 (14.8)
Coronary Artery Disease – no. (%)	9 (7.8)
Heart Failure – no. (%)	7 (6.1)
Redo Procedure – no. (%)	8 (7)
Left Atrial Diameter (mm)	41.5

Table 2
Procedure and follow-up data.

Procedure time (minutes)	141.5 ± 34.4
Fluoroscopy time (minutes)	33.4 ± 12.8
Mean ablation duration at each lesion	12.1 ± 1.8
Char Formation	0
Steam-pops	0
Procedure related stroke - no. (%)	0 (0)
Procedure related systemic embolism - no. (%)	0 (0)
Recurrence of arrhythmia – no. (%)	
Atrial fibrillation – no. (%)	14 (12.2)
Atrial tachycardia – no. (%)	9 (7.8)
Perimitral Flutter – no. (%)	1 (0.9)
Septal macro-reentrant tachycardia – no. (%)	1 (0.9)
Micro-reentry at pulmonary vein isolation border no. (%)	3 (2.6)
Gastrointestinal symptoms – no. (%)	5 (4.3)
Esophagogastroduodenoscopy – no. (%)	1 (0.9)
Atrio-esophageal fistula – no. (%)	0 (0)
Drug compliance at 2nd month of follow-up- no. (%)	
Proton-pump inhibitor	115 (100)
Sucralfate	115 (100)
Colchicine	110 (95.6)

Several approaches have been recommended to reduce the incidence of esophageal complications during AF ablation including using esophageal temperature monitor, reducing AF power on the posterior wall, using esophageal deflection device, and even avoiding ablation on the trajectory of the esophagus.¹ Whether HSPD ablation has an influence on esophageal complications has still not been clearly elucidated. While Winkle et al have noted low incidence of major complications with HPSD, it is known that HSPD (50Watts/6 s) may cause severe esophageal temperature increase.^{13,14} In our opinion this observations coupled with power of HPSD merits additional protective measures to ensure low GIAE.

The protective effect of PPIs on esophageal and gastric mucosa is well-established, and while PPIs are mentioned in current AF ablation guidelines, they are not routinely recommended.¹ Although scientific data is lacking, acid suppression with PPIs has become a frequent strategy for AEF prophylaxis.¹⁰ Sucralfate, due to barrier and cytoprotective effect on esophageal mucosa, has been used in various esophageal disease.¹⁵ Of note, microvascular protection associated with sucralfate may be an important mechanism in prevention of esophageal injury originating from extraluminal source, such as is the case in ablation injury.¹⁶ Preservation of vascular epithelium may be associated with a limited transmural injury thus allowing repair process and which may lower incidence of adverse events. In one study, PPI + sucralfate regimen has been used successfully in AF ablation patients noted to have esophageal injury in upper gastrointestinal endoscopy.⁹ Colchicine is an anti-inflammatory drug that has been previously associated with lower post-ablation AF reoccurrence rates.¹⁷ The anti-inflammatory properties of this drug may reduce inflammatory response to esophageal injury.¹⁸

We hypothesize that the mucosa-protective and anti-inflammatory effects of the triple regimen may lead to low incidence GIAE.

In one study, capsule endoscopy within 48 h after AF ablation identified esophageal lesions in 17% of patients, and 6.8% of patients reported symptoms.¹⁹ Although comparison in terms of endoscopic visualization of esophageal injury is not possible, incidence of symptoms was actually observed to be lower in our study (i.e. 4.3%), which could point to effectiveness of the triple regimen. Although it is reassuring that no AEF was observed in our study, it can be a play of chance as the reported incidence of this dreadful complication is extremely low.

4.1. Limitations

The limitations of our study include small sample size and absence of routine gastrointestinal imaging after the procedure. This descriptive study should be viewed as hypothesis generating and further studies are necessary for confirmation of the cost-effectiveness of the suggested prophylactic regimen.

5. Conclusion

The triple regimen is relatively inexpensive, generally well tolerated, and has been associated with very low incidence of GIAE in the patients who have undergone extensive HPSD posterior wall ablation.

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What is Already Known?

- High-power, short duration posterior left atrial wall ablation is an emerging technique in atrial fibrillation ablation, albeit anatomical proximity of the esophagus may lead to increased complication rate

What this study adds?

- Prophylactic administration of proton-pump inhibitor with sucralfate and colchicine was associated with low incidence of gastrointestinal symptoms and/or complications in patients who have undergone high-power short duration posterior left atrial wall ablation

Declaration of competing interest

There is no conflict of interest.

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Authors have nothing to disclose.

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