

Outcomes of Convergent Ablation Procedure using a Cryo-balloon Catheter for Treatment of Persistent Atrial Fibrillation (Poster)

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Overview

Research Question: Does the use of a cryo-balloon catheter during the endocardial portion of a convergent procedure elicit greater success rates towards eliminating recurrent atrial fibrillation than using a radiofrequency catheter?

Background: Traditional catheter based treatment for atrial fibrillation (AF) uses radiofrequency as a source of energy for the ablation of atrial tissue. This is an endocardial (inside the heart) technique. The success rate of this technique at one year is around 50-60%¹. In the last three years, a novel technology using a combined/hybrid trans-diaphragmatic surgical epicardial (outside the heart) ablation with endocardial (inside the heart) ablation has had one-year success rates close to 80%². This is called the Convergent Procedure (CP)³. The CP can be done with either radiofrequency ablation (RF), or with a cryo-balloon catheter to create the endocardial lesion set. The cryo-balloon technique may be a preferred approach, as it improves endocardial coverage of the pulmonary veins. Limited data is available on the cryo-balloon technique for CP.

Methods

From October 2013 to May 2016, 45 AF patients underwent the convergent procedure with cryo-balloon endocardial ablation at LVHN. Patients were managed postoperatively medically and followed up with in the office 1 month, 3 months, 6 months, and 12 months after the surgery. Most (87%) patients received an implantable monitoring device that was interrogated at each visit for arrhythmias. Medical records were reviewed to determine pre-operative comorbidities and post-operative outcomes.

- AF patients are treated medically, through cardioversions, and/or with traditional ablations.
- If all these treatment options continue to fail, patients are considered appropriate candidates for the convergent procedure.

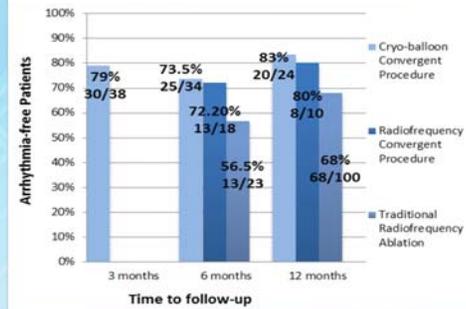
- A cardiothoracic surgeon enters the peritoneal cavity with a radiofrequency ablation device through a small incision approx. 2 cm below the xiphoid process.
- The surgeon ablates the posterior aspect of the heart in a linear fashion from the left pulmonary veins to the right pulmonary veins

- An electrophysiologist positions a cryo-balloon catheter in each of the four ostia of the pulmonary veins, ensuring occlusion via ICE imaging and lack of color flow.
- The cryo-balloon is then inflated with a liquid refrigerant that evaporates and scars the tissue of the pulmonary vein, thus eliminating any electrical conduction that could interfere with electrical currents in the atria and cause atrial fibrillation

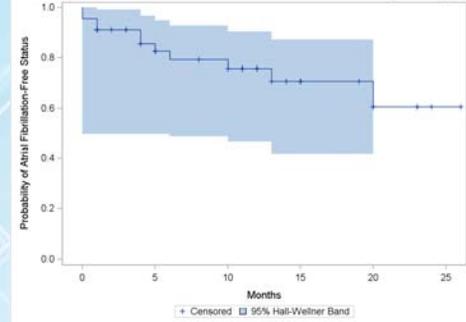
- After surgery, patients were started on amiodarone, steroids, anticoagulants, and anti-inflammatories
- At the follow-up, patients' monitoring devices were interrogated and ECGs were administered to determine heart rhythm.
- Medication was adjusted as needed.

Results

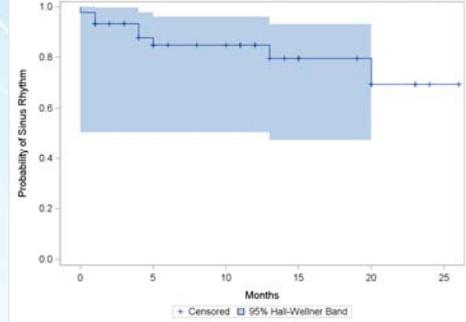
Success of Convergent Procedure using Cryo-balloon catheter vs. Literature review values



Kaplan-Meier Estimates of Atrial Fibrillation-Free Status Post Convergent Surgery



Kaplan-Meier Estimates of Sinus Rhythm Post Convergent Surgery



Discussion

Data Analysis

The bar graph depicts the percentage of LVHN patients that were free of AF post convergent procedure compared to similar data from various studies.

The first Kaplan Meier curve estimates the likelihood of maintaining atrial fibrillation-free status post convergent procedure over time. After receiving the convergent procedure with cryoballoon catheter, 75.56% (34) of patients did **not** experience a recurrent AF episode, while 24.44% (11) had experienced at least one recurrent AF episode.

The second Kaplan Meier curve estimates the likelihood of being in sinus rhythm at the most recent follow up, postoperatively. 82.22% (37) patients **were not** experiencing a recurrent AF episode at the time of the most recent follow-up and 17.78% (8) were experiencing a recurrent AF episode at the time of follow up.

Procedural Complications

- A total of three patients (6.7%) experienced rare adverse effects from the operation.
- One patient suffered from pericardial effusion and one from a hemoperitoneum with bleeding around trocar sites.
- Both patients recovered successfully.
- Another patient experienced bleeding from groin puncture, and required factor VII.
- This patient had two failed cardioversions postoperatively
- There were no procedural mortalities, no atrioesophageal fistulas, and no pericardial tamponade.

Study limitations

- A retrospective review of symptomatic AF patients that received Convergent Procedure with a cryo-balloon ablation
- No quality of life survey administered.
- No control group. Utilized literature review.
- Some patients underwent their CP less than a year before the conduction of study. Thus, limited follow-up data was available.

Conclusions

This study of 45 patients suggests that the use of a cryo-balloon catheter for endocardial ablation during the convergent procedure is a viable method to eliminate the recurrence of persistent atrial fibrillation and arrhythmias.

Other data should be collected on the time and cost efficiency of the cryo-balloon versus radiofrequency technique.

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