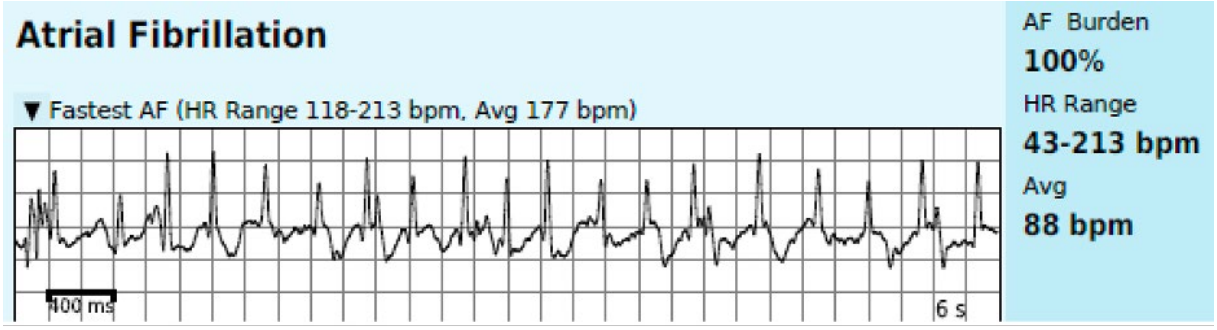
Hybrid Epicardial-Endocardial Ablation and Surgical Left Atrial Appendage Management in a Patient with Atrial Fibrillation and Heart Failure: A Case Study

A 64-year-old former triathlete, previously in excellent health, developed an abrupt rise in resting heart rate, from 40s to 80s, two years prior, and was found to be in rate-controlled atrial fibrillation (AF) with left ventricular ejection fraction (LVEF) mildly reduced at 45–50%, and moderate left atrial (LA) enlargement. Stress test was normal. Cardioversion resulted in 3 days of sinus rhythm before persistent AF recurrence. A rate control strategy was recommended.



Despite adequate rate control and guideline-directed heart failure treatment, his exercise tolerance gradually declined over the next 18 months. LVEF fell to 35% then 27%, and he developed progressive heart failure symptoms. He was referred to our center for heart transplant evaluation and AF management; rhythm control was recommended due to multiple randomized studies showing the benefits of sinus rhythm in heart failure patients.

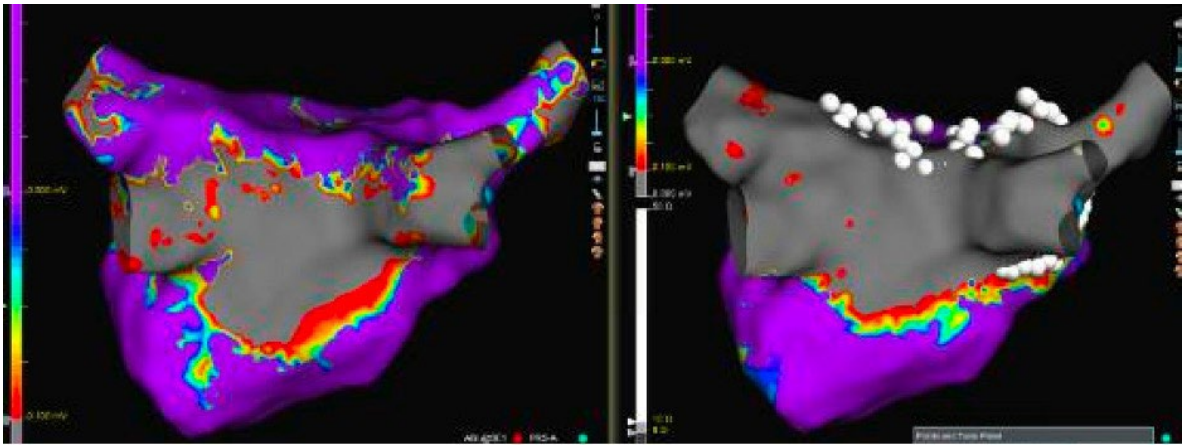
Given his longstanding persistent AF, enlarged left atrium, and inability to maintain sinus rhythm after cardioversion, a de novo hybrid epicardial–endocardial ablation with concomitant surgical left atrial appendage (LAA) exclusion was recommended. This approach has been shown to be more effective than endocardial ablation alone in patients with longstanding persistent AF.

In the epicardial procedure, the surgeon used EPi-Sense® radiofrequency (RF) ablation to treat the posterior wall, Coolrail® ablation for the superior LA and base of the LAA and placed a 45 mm AtriClip® to exclude the LAA. When he returned 6 weeks later for the endocardial procedure, a transesophageal electrogram showed flush LAA occlusion, and electroanatomic mapping (Ensite®, HD Grid®) showed a large area of low voltage from prior epicardial ablation in the inferior-posterior LA. Cryoballoon and RF ablation were used to complete the endocardial lesion set.

Atrial Fibrillation and Heart Failure: A Case Study

Baseline endocardial LA voltage map

Final LA endocardial voltage map



Amiodarone was discontinued 4 weeks post-procedure. Serial 7-day Holter monitors at 3, 6, 12, and 24 months confirmed sustained sinus rhythm without AF recurrence. Exercise tolerance gradually improved back to baseline. At 6 months, echocardiography showed normalized LV size (LVEF 55–60%) and reduced LA size. The patient resumed exercise training and completed a half-marathon 7 months post-ablation, reporting marked improvement in well-being ('I can't believe I thought I was asymptomatic'). Structural remodeling induced by AF reversed with maintenance of sinus rhythm. These benefits were maintained over the first 2 years of follow-up.

Key Takeaways

- The vicious cycle of AF and heart failure can be interrupted by rhythm control, and specifically by catheter ablation. Rhythm control with ablation is the first-line treatment approach for AF patients with heart failure, even when cardiomyopathy is not caused by AF.
- Hybrid ablation might be especially useful in treating patients with heart failure who have longstanding persistent AF and/or structural remodeling.
- For the patient described here, hybrid ablation and LAA exclusion with AtriClip improved health outcomes as compared to medical therapy alone and may have prevented him from needing heart transplantation.

U.S. Indications for EPi-Sense Coagulation System/EPi-Sense® ST Coagulation Device:
The EPi-Sense Coagulation System/EPi-Sense ST Coagulation Device is intended for the treatment of symptomatic long-standing persistent atrial fibrillation (continuous atrial fibrillation greater than 12 months duration) when augmented in a hybrid procedure with an endocardial catheter listed in the instructions for use, in patients (1) who are refractory or intolerant to at least one Class I and/or III antiarrhythmic drug (AAD); and (2) in whom the expected benefit from rhythm control outweighs the potential known risks associated with a hybrid procedure such as delayed post-procedure inflammatory pericardial effusions. ***Contraindications*** *include patients with Barrett's Esophagitis, left atrial thrombus, a systemic infection, active endocarditis, or a localized infection at the surgical site at the time of surgery.* ***Adverse Events:*** *Reported adverse events associated with epicardial ablation procedure may include, but are not limited to, the following: pericardial effusion/cardiac tamponade, pericarditis, excessive bleeding, phrenic nerve injury, stroke/TIA/neurologic complication.* ***Warnings:*** *Physicians should consider post-operative anti-inflammatory medication to decrease the potential for post-operative pericarditis. and/or delayed post-procedure inflammatory pericardial effusions. Physicians should consider post-procedural imaging (i.e. 1-3 weeks post-procedure) for detection of post-procedure inflammatory pericardial effusions.* ***Precautions:*** *Precautionary measures should be taken prior to considering treatment of patients: (1) Deemed to be high risk and who may not tolerate a potential delayed post-procedure inflammatory pericardial effusion. (2) Who may not be compliant with needed follow-ups to identify potential safety risks. To ensure patients undergoing treatment with the EPi-Sense/EPi-Sense ST device are well informed, the benefits, potential risks and procedural outcomes associated with the EPi-Sense/EPi-Sense ST Hybrid Convergent procedure should be discussed with the patient. Physicians should document accordingly in the medical record. Qualified operators are physicians authorized by their institution to perform surgical sub-xyphoid pericardial access. The coagulation devices should be used by physicians trained in the techniques of minimally invasive endoscopic surgical procedures and in the specific approach to be used. Operators should undergo training on the use of EPi-Sense/EPi-Sense ST device before performing the procedure. Safety and effectiveness of concomitant left atrial appendage closure was not evaluated in the CONVERGE study. Follow-up should be conducted at approximately 30 days post procedure to monitor for signs of delayed onset pericarditis or pericardial effusion.*

U.S. Indications for AtriClip® LAA Exclusion System:
The AtriClip LAA Exclusion System is indicated for the exclusion of the heart's left atrial appendage, performed under direct visualization[1] and in conjunction with other cardiac surgical procedures.

[1]Direct visualization, in this context, requires that the surgeon is able to see the heart directly, with or without assistance from a camera, endoscope, etc., or other appropriate viewing technologies

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