Clipping to sinus rhythm: cardioversion of atrial fibrillation by a thoracoscopic left atrial appendage occlusion

Vedran Velagić*, Gian-Battista Chierchia, and Mark La Meir

Centre for Cardiovascular Diseases, Universitair Ziekenhuis Brussel, Vrije Universiteit Brussel, 101 Laarbeeklaan, 1090 Brussels, Belgium

* Corresponding author. Tel: +385 91 7929284; fax: +322 477 6851, E-mail address: vvelagic@gmail.com

A 52-year-old male with a long-standing persistent atrial fibrillation has undergone the hybrid procedure after an unsuccessful first endocardial ablation. A thoracoscopic video-assisted epicardial pulmonary vein isolation was performed, alongside with the creation of the ‘box lesion’ set and the left atrial appendage clipping. Upon the clipping of the appendage, patient returned to sinus rhythm.

A hybrid approach with a thoracoscopic video-assisted pulmonary vein isolation is an emerging method for the treatment of patients with a long-standing persistent atrial fibrillation (AF). Concurrently, epicardial clipping of the left atrial appendage (LAA), which might also

![Figure 1](image-url)  

Figure 1. (A) Epicardial left atrial appendage electrograms before and after the epicardial RF ablation. (B) Entry and exit blocks after the appendage clipping.
provide electrical isolation, can be performed. Possible advantage of electrical disconnection of the left appendage comes at the expense of increased risks of complications that are associated with a thoracoscopic approach compared with standard percutaneous AF ablation. Left atrial appendage is a known source of AF triggers, and here we present a case of restoration of sinus rhythm upon the epicardial LAA clipping.

A 52-year-old male patient with a long-standing persistent AF, mild non-ischaemic cardiomyopathy and mildly dilated left atrium were scheduled for a hybrid AF ablation. The first presentation of the arrhythmia was a transient ischaemic attack which occurred in February 2014. Classic endocardial radiofrequency (RF) ablation was performed in June 2014 in another hospital. Besides the pulmonary vein isolation, a ‘box lesion’ set, mitral line, and coronary sinus defragmentation were performed at that time. Atrial fibrillation soon re-occurred, so the patient was brought to our attention.

In a general anaesthesia, via a thoracoscopic video-assisted approach, the epicardial RF ablation (AtriCure Synergy Ablation Clamp, AtriCure Inc.) was performed. Pulmonary veins were isolated, alongside with the creation of a ‘box lesion’ set in the posterior left atrium. Epicardial electrograms at the different sites in the left atrium were recorded with a standard quadripolar electrophysiology catheter, before and after the delivery of RF lesions. Before the completion of ‘box lesion’ set, we have witnessed a frequency gradient between the appendage and surrounding left atrium with the slower activation of LAA. Interestingly, the cycle length of LAA activation recorded epicardially decreased from 250 to 210 ms, after the completion of ablation, and electrograms became fractionated (Figure 1A). Afterwards, using the same thoracoscopic approach, epicardial LAA clipping (AtriClip Pro, AtriCure Inc.) was performed during which patient converted to sinus rhythm. There was no more electrical activity in LAA, and entry and exit blocks were confirmed (Figure 1B). In the second stage of the procedure, standard transvenous approach was used to confirm the completeness of the epicardial ablations lesions. No further endocardial RF ablation was performed.

We hypothesize that, by isolating the pulmonary veins and the posterior wall of the left atrium, LAA became the main AF driver, marked by a new fractionation of the local electrograms. Consequently, the effective electric isolation of the appendage by a mechanical ligation stopped the arrhythmia and patient returned to sinus rhythm. The hypothesis that LAA became the main AF driver after the epicardial ablation could not be tested at the time, it remains a theory and other possible explanations might be plausible. It is important to note that the epicardial appendage clipping might provide not only the functional occlusion but also the electrical isolation of LAA, unlike the percutaneous devices that leave the arrhythmogenic potential of the appendage untouched. Furthermore, we recognize the fact that conversion to sinus rhythm after extensive ablation and appendage clipping is not necessary related to the LAA isolation and that previous extensive conventional AF ablation strongly influences the electrophysiological findings that we detected during the hybrid procedure.

Conflict of interest: M.L.M. is a consultant for Atricure.

References