

Atrial Fibrillation Ablation, Stroke, and Hematemesis: Fatal Outcome



Ablación de fibrilación auricular, ictus y hemorragia digestiva: desenlace fatal

To the Editor,

Atrial fibrillation (AF) is the most common cardiac arrhythmia, and its prevalence is increasing in our setting.¹ AF is one of the main causes of stroke, heart failure cardiac morbidity, and sudden cardiac death. Although the treatment is mainly pharmacological, percutaneous and surgical ablation techniques are also used for this purpose.

We present the case of a patient who underwent radiofrequency ablation of AF, with a fatal outcome. A 61-year-old woman with Fabry disease had renal (proteinuria), ocular (cornea verticillata), and cardiac involvement (persistent AF, asymmetrical left ventricular hypertrophy, progressive left ventricular dysfunction at 40% in the last determination, and atrioventricular conduction defects requiring implantation of a dual-chamber pacemaker). She was receiving enzyme replacement therapy with agalsidase alfa twice weekly, candesartan, bisoprolol, furosemide, spironolactone, and apixaban. The patient had recurrent AF episodes with poor hemodynamic tolerance, which had been treated with electric cardioversion on several occasions, but with early relapses. Attempts were made to maintain sinus rhythm with amiodarone, but she developed drug-related hepatotoxicity, which led to permanent withdrawal of this treatment. In light of the patient's symptoms, a strategy of percutaneous radiofrequency ablation was contemplated to control the arrhythmia. The procedure was performed with a TactiCath Quartz 75 irrigated catheter with a contact force sensor (St Jude Medical). Electrical isolation of the pulmonary veins was carried out. As the patient had persistent AF with several relapses, in addition to associated structural heart disease with considerable left atrial dilatation, ablation lines were performed in the posterior wall of the left atrium and mitral isthmus, as well as ablation of complex fragmented atrial electrograms. Radiofrequency applications lasted <15 s with a contact force of <10 g and power of ≤ 25 W, with the aim of increasing the safety of the procedure.

At 18 days following the procedure, the patient was admitted for a new episode of heart failure with recurrent AF. During hospitalization, she experienced sudden onset of hemiparesis and

facial paralysis. Cranial computed tomography was performed to investigate the presence of an intracranial hematoma, with normal findings. Suddenly, she showed frank hematemesis with hemodynamic instability, which required stabilization. Emergent endoscopy of the upper gastrointestinal tract was performed to rule out gastrointestinal bleeding related to the oral anticoagulation. Clot remnants were seen in the gastric fundus, and during withdrawal of the endoscope, an image similar to that of a pulsatile diverticulum, was observed in the middle third of the esophagus. Immediately, and coinciding with air insufflation, the patient experienced ventricular fibrillation refractory to advanced cardiopulmonary resuscitation maneuvers and died. An atrioesophageal fistula secondary to AF ablation was strongly suspected. Clinical autopsy confirmed the diagnosis (Figures 1 and 2), and provided macroscopic data consistent with cardiac involvement due to Fabry disease.

In our patient, the presumed pathophysiology underlying the neurological symptoms was an embolism caused by an air bubble or food content passing from the esophagus to the left atrium and deposited in the brain tissue through the systemic circulation. The gastrointestinal bleeding can be explained by passage of blood from the left atrium to a low-pressure chamber, like the esophagus, and the ventricular fibrillation by passage of insufflated air from the esophagus to the left ventricle during gastrointestinal endoscopy.

Electrical isolation of pulmonary veins is an effective, widely used technique to treat AF. Radiofrequency energy or cryotherapy is used to electrically isolate the atrial tissue implicated in generating or sustaining the arrhythmia.² Additional ablation lines can be applied in the left atrial wall when there is structural heart disease, as was seen in our patient.

This procedure has a class I recommendation in clinical practice guidelines³ for symptomatic paroxysmal AF failing antiarrhythmic



Figure 1. View of the esophagus with a fistula in the lower third (center) and the aorta (to the right) with no relevant macroscopic abnormalities.



Figure 2. The tip of the cannula is seen in the left atrium, accessed through the fistula coming from the esophagus (not seen in this view).

treatment, and a class IIa indication in some cases of persistent symptomatic AF failing treatment.

Although the technique is quite safe, it is not free from complications. The mortality rate is estimated at less than 2 deaths per 1000 procedures.³ In Spain, 2953 procedures were indicated in 2016, with an acceptable technique-associated complication rate (3.9%) and no reported deaths.⁴ Complications, although infrequent, are potentially fatal, including cardiac tamponade, stroke, and atrial-esophageal fistula, among others. An experienced team, together with adequate patient selection, significantly reduces the incidence of these complications.⁵ In addition, a recent study has related the CHA₂DS₂-VASc score with the risk of periprocedure complications.⁴

Atrioesophageal fistula is an uncommon complication (< 1 per 1000 patients)² that can develop between 3 days and 5 weeks following ablation. It should be promptly suspected when there is onset of fever, chest pain, dysphagia, gastrointestinal tract bleeding neurological symptoms, or sepsis. Associated mortality is around 100% when untreated and 32% when prompt surgery is performed.⁶

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Utility of the Hybrid Operating Room for Lead Extraction: Initial Experience in a Single Center



Utilidad del quirófano híbrido en la extracción de dispositivos implantables: experiencia inicial de un centro

To the Editor,

Although the extraction of implanted pacing devices is now a standard activity in electrophysiology laboratories, these procedures are considered to carry a high risk of potentially serious complications.¹

Most extractions can be performed percutaneously using the appropriate tools. However, a small percentage ultimately requires a surgical approach. Additionally, other intermediate situations require both a percutaneous and surgical approach. The availability of a hybrid operating room can enable and facilitate the completion of such mixed interventions in a single surgical procedure. In addition to all of the benefits of a conventional operating room, hybrid operating rooms include an integrated fluoroscopy system that permits procedures based on percutaneous access (Figure 1A).² Here, by discussing 3 procedures performed between January and November 2017, we present the experience of our group with the use of a hybrid operating room for lead extraction.

The first case involves a 32-year-old woman with single-ventricle physiology and a dual-chamber transvenous pacemaker implanted in 2013 due to atrioventricular block (AVB). After the implantation, the patient developed recurrent strokes, despite adequate oral anticoagulation. Because the embolic strokes were suspected to be originating at the pacemaker leads, we decided to replace the endocavitary leads with epicardial ones. The procedure was

performed in the hybrid operating room; first, the epicardial leads were implanted via thoracoscopy (Figure 1B); then, both transvenous leads were percutaneously removed by means of separate locking stylets (LLD, Spectranetics) and a mechanical extraction sheath (TightRail 9 Fr, Spectranetics), and complete extraction was achieved (Figure 1C).

The second case concerns a 58-year-old man with a DDD pacemaker introduced through the left subclavian in 2007 due to AVB. In 2015, a dual-chamber implantable cardioverter-defibrillator was implanted on the right side in a second hospital center due to ventricular arrhythmias. The right side was used due to occlusion of the left subclavian vein, and the left side leads were left in place. The patient was referred to our center due to endocarditis of the pacemaker/implantable cardioverter-defibrillator lead with positive blood cultures and positive positron emission tomography-computed tomography (Figure 1D). Given that the patient was dependent on the pacemaker and had potentially infected bilateral leads, we decided to implant epicardial leads and percutaneously extract all of the endocardial leads in the same procedure. An epicardial pacing lead was implanted in the left ventricle with a defibrillation coil through a left minithoracotomy. Another epicardial lead was implanted in the right atrium via a right minithoracotomy. The leads on the right side were then percutaneously extracted using separate locking stylets (LLD, Spectranetics) and a mechanical extraction sheath (TightRail 11 Fr, Spectranetics). Finally, both leads on the left side were removed with an LLD locking stylet and a 9 Fr mechanical sheath (Figure 1E and F).

The final case involves a 14-year-old boy with a perimembranous ventricular septal defect, treated in 2003, and a right-sided VVI pacemaker implanted due to postoperative AVB.