Initial Experience With a New Ablation Catheter Using Laser Energy for Electrical Pulmonary Vein Isolation

Experiencia inicial con un nuevo catéter balón de ablación con energía láser para el aislamiento eléctrico de las venas pulmonares

To the Editor,

Catheter ablation is the recommended treatment in patients with paroxysmal atrial fibrillation refractory to antiarrhythmic therapy or with symptomatic persistent atrial fibrillation that cannot be controlled by other therapeutic strategies. The main objective of this procedure is electrical isolation of the pulmonary veins. The most widely used techniques are point-by-point radiofrequency ablation and cryoablation. Recently, an ablation system has been introduced that uses laser energy. The catheter, which includes a compliant balloon, enables direct visualization of the left atrium and the pulmonary veins to guide the ablation. The first clinical results showed good safety and efficacy. Our objective was to describe the first use of the laser balloon catheter for pulmonary vein isolation in Spain, evaluating its efficacy and safety.

We included patients who underwent ablation of atrial fibrillation between February 2013 and March 2014. All patients signed an informed consent form. We excluded those with a long history of persistent atrial fibrillation or significant structural heart disease.

The ablation system (CardioFocus, Marlborough, Massachusetts, United States) includes the following components (Figure A): a steerable sheath (15 Fr), adaptable to a balloon catheter, with an adjustable diameter (up to 35 mm) and an atraumatic tip (Figure B); an endoscope (2 Fr); an optical fiber; and a console for selection of the power and duration of the applications. The endoscope and optical fiber are inserted via the balloon catheter. As viewed with the endoscope, blood is red and the tissue in contact with the balloon is white (Figure C); there is a blind area of 45°, making it necessary to rotate the catheter to complete the ablation line. Energy (a 980 nm diode laser) is applied by the optical fiber.

A quadripolar catheter was used to stimulate the phrenic nerve during ablation and an esophageal temperature probe was inserted. Following pulmonary vein angiography, the balloon catheter was introduced and was inflated until the occlusion of each vein was completed. The antral or ostial anatomy was confirmed by the radiological or endoscopic image. The objective was to direct the laser beam as close as possible to the antrum. Each application overlapped the preceding one by 30% to 50% to achieve a continuous ablation line. The energy applied (5.5-12 W) was adjusted according to the expanse of tissue visualized and the presence of blood trapped by the balloon. Once the circumference of each vein had been completely encircled, bidirectional block was confirmed. When conduction persisted, additional applications were carried out in accordance with Lasso® catheter recordings.

Forty-two patients underwent laser catheter ablation. The patients’ characteristics are summarized in the Table. The pulmonary vein anatomy was normal in 86% of the patients, that of the left common pulmonary vein in 7%, and that of the right common pulmonary vein in 5%. The mean duration (standard deviation) of the procedure was 159 (30) minutes, with a mean fluoroscopy time of 41 (15) minutes. In all, 162 (99%) of the 164 veins included were isolated. Ablation of both ipsilateral veins was accomplished with a single encirclement in 21% of the

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http://dx.doi.org/10.1016/j.rec.2014.07.013

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**Figure.** A: Components of the ablation system. B: Adaptable balloon with soft, atraumatic tip. C: Endoscopic view of pulmonary venous antrum.


