

## A New Experience in Atrial Fibrillation

### *Una nueva experiencia en fibrilación auricular*

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Pulmonary vein (PV) isolation is the treatment of choice and the most effective method for sinus rhythm control in patients with paroxysmal atrial fibrillation (PAF), with a low rate of comorbidities. (1)

The experience acquired by operators, technique improvements and technological development make the procedure safer and more efficient. However, the rate of recurrence after ablation is still important, and the results can be improved. (2)

The mechanism of recurrence is due to multiple factors and depends on when it occurs. Recurrence within the first days after the procedure is due to inflammation triggered by ablation and does not predict late recurrence. Early recurrence (<3 months) and within the year is due to reconnection of the PV or activity of extrapulmonary foci. Recurrences after the year will depend on the cause and comorbidities responsible for arrhythmia. Modifiable factors as obesity, alcohol intake, hypertension, sleep apnea, and diabetes, among others, predispose to the development of atrial fibrillation (AF) and predict recurrence after ablation. It has been shown that the detection and adequate control of these risk factors reduce the rate of recurrence and improve the outcome of these patients. (3)

In the study published in this issue of the Argentine Journal of Cardiology, Tomas et al. describe a series of 1,000 patients with PAF undergoing PV isolation using radiofrequency catheter ablation. (4) The aim of this retrospective study was to determine the predictors of recurrence at one year and the procedure safety. The patients included were young (mean age 62 years) and had low embolic risk and rate of comorbidities.

Follow-up quality of the patients undergoing ablation is limited due to the retrospective nature of the study. Almost 50% of patients were excluded from the analysis because they were lost to or did not complete follow-up. The reason for excluding these patients is not explained but seems to introduce a bias with an impact that is difficult to quantify. A more rigorous follow-up compliance can indicate that the patients included are those more aware of their health status

and probably more prone to adhere to the treatment of other comorbidities.

Fifty percent of the patients with symptomatic AF referred for catheter ablation have asymptomatic episodes. These asymptomatic episodes are greater after ablation. (5) Therefore, a more rigorous follow-up could detect asymptomatic recurrences. In this study, 25% of the patients included did not undergo Holter monitoring or if they did, the results are unknown. Therefore, the real rate of recurrence seems to be underestimated.

In patients who completed follow-up at one year, the rate of recurrence was 77%. Early recurrence and the number of episodes before ablation were the only predictors of recurrence at one year.

In patients with a healthy heart, reconnection of the PV is the main cause of recurrence at one year.

The goal of the procedure is to achieve definite isolation of the PV. Pulmonary vein reconnection is the Achilles' heel of this intervention. Different types of energy are used to improve the outcomes of ablation; yet, radiofrequency is still the most common method used. Pulmonary vein isolation is achieved by applying lesions around the antrum of the four veins. When the procedure is performed using conventional irrigated-tip catheters, recurrence is about 65%. (6) Nowadays, contact force sensing catheters provide information about the quality of contact with the atrium, allowing safer and more definite transmural lesions. The first studies using this technique showed that poor contact is a predictor for electric reconnection of the PV. (7) Contact optimization allowed reduction in the rate of reconnection during the procedure to 85% and reduced the rate of recurrence to 15%, (8-10) even though experimental studies have demonstrated that radiofrequency power is the major determinant of lesion size compared with contact force. (11) Nakagawa developed a formula incorporating contact force, radiofrequency power and application time that predicts lesion depth. (12) This index was prospectively evaluated, showing that it increased the rate of acute success and reduced recurrence. (13)

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The number of episodes of AF before ablation is another weaker predictor of recurrence. Although the presence of AF favors its recurrence and persistence, the rate of progression of paroxysmal AF to persistent AF in clinical practice during the first year after ablation is low in patients without comorbidities. (14) This is important at the moment of interpreting the mechanism of recurrence of these patients when only the rate of annual recurrence is evaluated. Considering the low rate of comorbidities, and the exclusion from the analysis of patients with persistent AF, disease progression does not seem to explain recurrence. On the contrary, this observation seems to indicate the presence of more active PV which have recovered their conduction and ability of inducing arrhythmia. This is important because it influences on the decision of performing a new intervention in these patients and explains the excellent results after a second procedure.

Other traditional predictors as obesity, alcohol intake, age, left atrial enlargement, sleep apnea, hypertension, or diabetes did not predict recurrence. As this is a “relatively healthy” population, the impact of these comorbidities is surely minimal. The importance of an adequate treatment of these comorbidities and their impact in the long-term should not be underestimated.

The low rate of complications reported in these series should be remarked; 4.6% of 1,000 cases analyzed presented major complications and there were almost no patients with irreversible events. This series demonstrates how this complex procedure can be safely performed in high-volume centers with experienced operators. Safety is perhaps the most important parameter to consider at the moment of choosing the adequate treatment for our patients and is especially relevant in this group of patients with low risk of complications related to AF.

#### Conflicts of interest

None declared.

(See authors' conflicts of interest forms on the website/Supplementary material).

#### REFERENCES

- Kirchhof P, Benussi S, Kotecha D, Ahlsson A, Atar D, Casadei B, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J* 2016;37:2893-962. <http://doi.org/b977>
- Ganesan AN, Shipp NJ, Brooks AG, Kuklik P, Lau DH, Lim HS, et al. Long-term outcomes of catheter ablation of atrial fibrillation: a systematic review and meta-analysis. *J Am Heart Assoc* 2013;2:e004549. <http://doi.org/sgj>
- Pathak RK, Middeldorp ME, Lau DH, Mehta AB, Mahajan R, Twomey D, et al. Aggressive risk factor reduction study for atrial fibrillation and implications for the outcome of ablation: the ARREST-AF cohort study. *J Am Coll Cardiol* 2014;64:2222-31. <http://doi.org/f2wfvj>
- Tomas L, Orosco A, Vergara JM, Rivera S, Vecchio N, Mondragón I et al. Predictor of recurrence and results in Paroxysmal atrial fibrillation Ablation. *Rev Argent Cardiol* 2017;85:240-6.
- Wokhlu A, Monahan KH, Hodge DO, Asirvatham SJ, Friedman PA, Munger TM, et al. Long-term quality of life after ablation of atrial fibrillation the impact of recurrence, symptom relief, and placebo effect. *J Am Coll Cardiol* 2010;55:2308-16. <http://doi.org/dpz4rv>
- Wilber DJ, Pappone C, Neuzil P, De Paola A, Marchlinski F, Natale A, et al; ThermoCool AF Trial Investigators. Comparison of antiarrhythmic drug therapy and radiofrequency catheter ablation in patients with paroxysmal atrial fibrillation: a randomized controlled trial. *JAMA* 2010;303:333-40. <http://doi.org/c8dw74>
- Neuzil P, Reddy VY, Kautzner J, Petru J, Wichterle D, Shah D, et al. Electrical reconnection after pulmonary vein isolation is contingent on contact force during initial treatment: results from the EFFICAS I study. *Circ Arrhythm Electrophysiol* 2013;6:327-33. <http://doi.org/f4sxxrh>
- Andrade JG, Monir G, Pollak SJ, Khairy P, Dubuc M, Roy D, et al. Pulmonary vein isolation using “contact force” ablation: the effect on dormant conduction and long-term freedom from recurrent atrial fibrillation- a prospective study. *Heart Rhythm* 2014;11:1919-24. <http://doi.org/f6pgcj>
- Marijon E, Faza S, Narayanan K, Guy-Moyat B, Bouzeman A, Providencia R. Real-time contact force sensing for pulmonary vein isolation in the setting of paroxysmal atrial fibrillation: procedural and 1-year results. *J Cardiovasc Electrophysiol* 2014;25:130-7. <http://doi.org/f5scv7>
- Natale A, Reddy VY, Monir G, Wilber DJ, Lindsay BD, McElderry HT, et al. Paroxysmal AF catheter ablation with a contact force sensing catheter: results of the prospective, multicenter SMART-AF trial. *J Am Coll Cardiol* 2014;64:647-56. <http://doi.org/f2th8b>
- Ikeda A, Nakagawa H, Lambert H, Shah DC, Fonck E, Yulzari A. Relationship between catheter contact force and radiofrequency lesion size and incidence of steam pop in the beating canine heart: electrogram amplitude, impedance, and electrode temperature are poor predictors of electrode-tissue contact force and lesion size. *Circ Arrhythm Electrophysiol* 2014;7:1174-80. <http://doi.org/f6tfrp>
- Nakagawa H, Ikeda A, Govari A, Papaioannou T, Constantine G, Bar-Tal M, et al. Prospective study using a new formula incorporating contact force, radiofrequency power and application time (force-power-time index) for quantifying lesion formation to guide long continuous atrial lesions in the beating canine heart. *Circulation* 2013;128:A12104.
- Hussein A, Das M, Chaturvedi V, Asfour IK, Daryanani N, Morgan M, et al. Prospective use of Ablation Index targets improves clinical outcomes following ablation for atrial fibrillation. *J Cardiovasc Electrophysiol* 2017. [Epub ahead of print] <http://doi.org/b98b>
- Kochhäuser S, Dechering DG, Troughton K, Hache P, Haig-Carter T, Khaykin Y, et al. Predictors for progression of atrial fibrillation in patients awaiting atrial fibrillation ablation. *Can J Cardiol* 2016;32:1348-54. <http://doi.org/f9dnhb>