



## Editorial

## How to make catheter ablation available world-wide?

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Atrioventricular nodal reentrant tachycardia (AVNRT) and atrioventricular nodal reentrant tachycardia (AVRT) are among the most common types of paroxysmal supraventricular tachycardia in younger individuals. In the case of AVNRTs, catheter-based slow pathway modification/ablation has been established as a first-line curative treatment modality with high success rates to improve symptoms. Ablation of accessory pathway ablation in patients has additional prognostic implications, as atrial fibrillation (AF) in patients with accessory pathway can result in ventricular fibrillation and sudden cardiac death. Ablation of AVNRT and AVRT has been performed for more than 30 years in the Western World. In addition to AVNRT and AVRT, ablation of AF gained more and more attention since the identification of triggers in the pulmonary veins by Haissaguerre in 1998, which was the basis of catheter-based isolation of the pulmonary veins [1]. AF is the most common sustained arrhythmia and is associated with significant morbidity [2], increased risk of stroke [3], reduced quality of life [4], and increased mortality. Concomitant risk factors such as hypertension, obesity, metabolic syndrome and increased aging lead to structural remodeling processes in the atria which contribute to the progressive nature of AF and the reduced efficacy of standard antiarrhythmic pharmacological and catheter-based rhythm control strategies in patients with more progressed AF-substrates [5].

Nowadays, AF ablation contributes to a majority of catheter-based ablation procedures in most parts of the Western World [6,7]. Important to note is the increase in absolute and relative numbers of AF ablations during the last decade. In Sweden the percentage of ablations for AF was 18% in 2006 and 40% in 2015, and in Spain 17% in 2012 and 23% in 2017 [6–8]. Interestingly, in the early days of catheter ablation in Europe roughly 30 years ago, an accessory pathway was the main reason for ablation (i.e. in 51% of the cases) [9]. These data represent procedures and the clinical practice in European countries. However, data on ablation procedures, indications and practices in less developed and poorer countries are sparse.

In this context, we read the article from Montanez and colleagues with great interest [10]. In this issue of the International Journal of Cardiology Heart & Vascular, they report the number of catheter ablations performed in poorer patients in Peru and the indications for which the ablations were performed. In 2015, the Ministry of Health of Peru inaugurated the first national center for electrophysiology studies in a public tertiary referral hospital to provide ablation to poor and

extremely poor patients through complete public health insurance coverage. Between 2015 and 2018, 55 catheter ablations were performed in 53 patients. Interestingly, the main indication for catheter ablation in these patients was an accessory pathway in 76% of the cases and the overall immediate success rate was high with 96.4% without any reported complications. This is conform with the observations of the SOLAECE registry in 13 Latin-American countries where an AP also was the main reason for catheter ablation in 31% of the ablations [11].

It is important to note that the indications for catheter ablations today differ significantly between western countries and Peru. This striking difference might be partly explained by the limited financial resources as well as the small number of hospitals and well-trained electrophysiologists performing ablation in Peru. When resources are limited, the available resources will be used to treat the diseases with the most impact on mortality or morbidity. Wolff-Parkinson-White ECG pattern with AF or syncope is an indication with prognostic implications due to the possible deterioration into ventricular arrhythmias. In patients with AVNRT and AF however, a rhythm control strategy has not shown to improve life expectancy and is only for symptom management [12].

In Europe the absolute number of catheter ablations per million inhabitants more than doubled over the last decade from 156 per million inhabitants in 2007 to 378 per million inhabitants in 2016 [13]. However, important regional differences are observed with the highest number of ablations performed in the Western European countries and the lowest in eastern European countries (923 per million and 205 per million inhabitants, respectively). The majority of the AF ablations is also performed in the western European countries [13]. The differences between Latin-American countries and European countries, but also between countries within one continent might be explained by different socio-economic status and different structures in health care insurance. Socio-economic status is not only an important issue between countries but also within a country when there is a public and private health care insurance. The article by Montanez et al. describes the numbers of catheter ablations in the poor and extremely poor inhabitants of Peru [11]. These are people who did not gain access to these therapies until the inauguration of the first national center for electrophysiology studies in 2015, whereas the wealthy population had access to catheter ablation for the last 17 years, mainly paid privately.

To further facilitate the infrastructure for a catheter-based ablation program in Peru, more hospitals need to be equipped with electrophysiology labs with dedicated ablation and mapping systems, and ablation procedures need to be accessible for poor and extremely poor patients through complete public health insurance coverage. Ablation tools are generally available, but particularly mapping systems are expensive which might be another reason why predominantly ablations for AVNRT and AVRT are performed in Peru since these procedures do not

necessarily required mapping systems. Another important point is the training of electrophysiologist to perform the ablations. In Peru for example, there are no structured fellowships for clinical electrophysiologists. To be able to increase the number of ablations and ensure the quality of the ablations, fellowships abroad in high-volume and internationally recognized centers should be offered in exchange programs. Last but not least these innovations and training programs have to be funded. Funding could be raised by either health insurances (private or public), the government or possibly the manufacturers of the ablation catheters or mapping systems.

Of note, the latest available randomized controlled trial on AF ablations, CABANA, could not proof a reduction of a composite endpoint of death, stroke, serious bleeding and cardiovascular death by catheter-based ablation in patients with AF compared to a conservative medical treatment [13]. Due to the lack of data proving a clear survival benefit in patients after AF ablation, conservative and pharmacological treatment options still remain an acceptable alternative management of AF patients. In addition to pharmacological treatment for rate- and rhythm-control, which can control symptoms of AF in most patients, also lifestyle interventions to control concomitant risk factors such as hypertension, obesity and sleep apnea, which have been shown to maintain sinus rhythm and prevent recurrences of AF may further prevent progression of AF [14]. Care pathways and programs also implementing these interventions may help to ensure optimal management of patients with AF and to bridge the time until eventually funding and infrastructures needed for catheter ablation in highly symptomatic patients in poorer countries is available.

## References

- [1] M. Haïssaguerre, P. Jaïs, D.C. Shah, A. Takahashi, M. Hocini, G. Quiniou, Le Mouroux, P. Le Métayer, J. Clémenty, Spontaneous initiation of atrial fibrillation by ectopic beats originating in the pulmonary veins, *N. Engl. J. Med.* 339 (1998) 659–666.
- [2] T.Y. Chang, J.N. Liao, T.F. Chao, J.J. Vicera, C.Y. Lin, T.C. Tuan, Y.J. Lin, S.L. Chang, L.W. Lo, Y.F. Hu, F.P. Chung, S.A. Chen, Oral anticoagulant use for stroke prevention in atrial fibrillation patients with difficult scenarios, *Int. J. Cardiol. Heart Vasc.* 20 (2018) 56–62.
- [3] H. Ayinde, M.L. Schweizer, V. Crabb, A. Ayinde, A. Abugroun, J. Hopson, Age modifies the risk of atrial fibrillation among athletes: a systematic literature review and meta-analysis, *Int. J. Cardiol. Heart Vasc.* 18 (2018) 25–29.
- [4] G.A. Dan, D. Dobrev, Antiarrhythmic drugs for atrial fibrillation: imminent impulses are emerging, *Int. J. Cardiol. Heart Vasc.* 21 (2018) 11–15.
- [5] C.S. Engelsgaard, K.B. Pedersen, L.P. Riber, P.A. Pallesen, A. Brandes, The long-term efficacy of concomitant maze IV surgery in patients with atrial fibrillation, *Int. J. Cardiol. Heart Vasc.* 19 (2018) 20–26.
- [6] F. Holmqvist, M. Kesk, A. Englund, C. Blomström-Lundqvist, L.O. Karlsson, G. Kenneback, D. Poçi, R. Samo-Ayou, R. Sigurjónsdóttir, M. Ringborn, C. Herczku, J. Carlson, E. Fengsrud, F. Tabrizi, N. Höglund, S. Lönnérholm, O. Kongstad, A. Jönsson, P. Insulander, A decade of catheter ablation of cardiac arrhythmias in Sweden: ablation practices and outcomes, *Eur. Heart J.* 40 (2019) 820–830.
- [7] F.J. García-Fernández, J.L. Ibáñez Criado, A. Quesada Dorador, Spanish catheter ablation registry. 17<sup>th</sup> official report of the Spanish society of cardiology working group on electrophysiology and arrhythmias, *Rev. Esp. Cardiol.* 71 (2018) 941–951.
- [8] Á. Ferrero de Loma-Orsio, E. Díaz-Infante, A. Marcías Gallego, Spanish catheter ablation registry. 12<sup>th</sup> official report of the Spanish society of cardiology working group on electrophysiology and arrhythmias, *Rev. Esp. Cardiol.* 66 (2013) 983–992.
- [9] G. Hindricks, The multicentre European radiofrequency survey (MERFS): complications of radiofrequency catheter ablation of arrhythmias, *Eur. Heart J.* 14 (1993) 1644–1653.
- [10] R. Montañez-Valverde, L.A. More, P. Mendoza-Novoa, First catheter ablations in the public health system of Peru: report of the initial experience, *Int. J. Cardiol. Heart Vasc.* 24 (2019) 100402.
- [11] R. Keegan, L. Aguinaga, G. Fenelon, W. Uribe, G. Rodriguez Diez, M. Scanavacca, M. Patete, R.Z. Carhuaz, C. Labadet, C. De Zuloaga, D. Pozzer, F. Scazzuso, The first Latin American catheter ablation registry, *Europace* 17 (2015) 794–800.
- [12] D.L. Packer, D.B. Mark, R.A. Robb, K.H. Monahan, T.D. Bahnson, J.E. Poole, P.A. Noseworthy, Y.D. Rosenberg, N. Jeffries, L.B. Mitchell, G.C. Flaker, E. Pokushalov, A. Romanov, T.J. Bunch, G. Noelker, A. Ardashev, A. Revishvili, D.J. Wilber, R. Cappato, K.H. Kuck, G. Hindricks, D.W. Davies, P.R. Kowey, G.V. Naccarelli, J.A. Reiffel, J.P. Piccini, A.P. Silverstein, H.R. Al-Khalidi, K.L. Lee, Effect of catheter ablation vs antiarrhythmic drug therapy on mortality, stroke, bleeding, and cardiac arrest among patients with atrial fibrillation: the CABANA randomized clinical trial, *JAMA* (2019) <https://doi.org/10.1001/jama.2019.0693>.
- [13] P. Kirchhof, S. Benussi, D. Kotecha, A. Ahlsson, D. Atar, B. Casadei, M. Castella, H.C. Diener, H. Heidbuchel, J. Hendriks, G. Hindricks, A.S. Manolis, J. Oldgren, B.A. Popescu, U. Schotten, B. Van Putte, P. Vardas, ESC Scientific Document Group, ESC guidelines for the management of atrial fibrillation developed in collaboration with EACTS, *Eur. Heart J.* 2016 (37) (2016) 2893–2962.
- [14] D. Linz, R.D. McEvoy, M.R. Cowie, V.K. Somers, S. Nattel, P. Lévy, J.M. Kalman, P. Sanders, Associations of obstructive sleep apnea with atrial fibrillation and continuous positive airway pressure treatment: a review, *JAMA Cardiol.* 3 (2018) 532–540.

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