

## **The unfinished issue of ischaemic stroke and embolic events during catheter ablation of atrial fibrillation.**

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**Words:** 528

We have read with interest the paper by Liu and colleagues [1]. A very low incidence of ischaemic stroke (0.36%; 7 patients) was reported in 1,946 consecutive procedures of catheter ablation of atrial fibrillation (AF). Findings are of importance but we would like to comment on two aspects that deserve reflection:

Firstly, the authors have failed both to provide the prevalence of the different used anticoagulation regimens, and to assess their impact on cerebrovascular events (anticoagulation regimen was not included on logistic regression), which we believe should have been addressed in this study, as interruption of oral anticoagulation has previously been shown to be a major predictor of embolic events[2].

Second, the authors suggest that previous ischaemic stroke, mechanical valve replacement and CHA<sub>2</sub>DS<sub>2</sub>-VASc score  $\geq 3$  are independent predictors of cerebrovascular complications during catheter ablation of AF. We believe that such a definite conclusion, which intuitively makes sense, may be premature, at least for the following reasons: a) even though the authors present data from almost two thousand procedures, due to the extremely low event rate, we fear the study may be underpowered; b) most centres are currently performing AF ablation using uninterrupted anticoagulation[3], contrary to what we observe in this sample.

Uninterrupted anticoagulation has shown to be associated with a lower rate of bleeding and embolic peri-procedural complications[2], and therefore we do not know if these single-centre data can be extrapolated to a wider population; c) in our single-centre experience of anticoagulation with heparin bridging (protocol and timing of anticoagulation interruption has been previously described[4]), in 1,483 consecutive procedures from September 2010 to August 2013 we have also observed a low incidence of ischaemic stroke (0.40%;n=6). Assessment for predictors of ischaemic events in our sample does not reproduce the data from *Liu* and colleagues, as high CHA<sub>2</sub>DS<sub>2</sub>-VASc (one patient had a score of 3 and the remaining had 1 or 2), previous stroke (not present in any of our patients) and mechanical valve replacement (one patient had a previous mitral valve repair procedure) were not predictors of ischaemic cerebral events. On the other hand, CHADS<sub>2</sub> and female gender were shown to be independent predictors in a previous randomized controlled trial including 1,584 patients[2]. Therefore, it is our belief that only a strong collaboration between high volume centres, with pooling of data from at least 10,000 procedures may be necessary to provide a more solid answer to the unsolved issue of peri-procedural stroke during AF ablation.

Previous evidence has suggested that these events may also occur more as a result of technical issues[5]. Procedural aspects (air embolism, intravenous heparin being given too late, sub-optimal ACT control, long radiofrequency application or warming up of the catheter tip with clot formation) may also be involved. However, as the latter may sometimes be unaccounted or under-reported in large registries, the occurrence of ischaemic events during catheter ablation of AF and the discovery of the true culprits may be a hard goal to achieve in the next years.

In the mean time, according to the last *Expert Consensus*, a carefully planned and highly meticulous ablation procedure, in highly experienced centres using non-interrupted anticoagulation and pre-procedural imaging may be the best way of minimizing the risk.

### **References:**

1. Liu Y, Zhan X, Xue Y, Deng H, Fang X, Liao H, Huang J, Liu F, Liang Y, Wei W, Wu S. Incidence and outcomes of cerebrovascular events complicating catheter ablation for atrial fibrillation. *Europace*. 2015 Dec 23. pii: euv356. [Epub ahead of print]
2. Di Biase L, Burkhardt JD, Santangeli P, Mohanty P, Sanchez JE, Horton R, Gallinghouse GJ, Themistoclakis S, Rossillo A, Lakkireddy D, Reddy M, Hao S, Hongo R, Beheiry S, Zagrodzky J, Rong B, Mohanty S, Elayi CS, Forleo G, Pelargonio G, Narducci ML, Dello Russo A, Casella M, Fassini G, Tondo C, Schweikert RA, Natale A. Periprocedural stroke and bleeding complications in patients undergoing catheter ablation of atrial fibrillation with different anticoagulation management: results from the Role of Coumadin in Preventing Thromboembolism in Atrial Fibrillation (AF) Patients Undergoing Catheter Ablation (COMPARE) randomized trial. *Circulation*. 2014;129:2638-44.
3. Chen J, Todd DM, Hocini M, Larsen TB, Bongiorni MG, Blomström-Lundqvist C; Scientific Initiative Committee, European Heart Rhythm Association. Current periprocedural management of ablation for atrial fibrillation in Europe: results of the European Heart Rhythm Association survey. *Europace*. 2014;16:378-81.

4. Providência R, Marijon E, Albenque JP, Combes S, Combes N, Jourda F, Hireche H, Morais J, Boveda S. Rivaroxaban and dabigatran in patients undergoing catheter ablation of atrial fibrillation. *Europace*. 2014;16:1137-44.

5. Gaita F, Leclercq JF, Schumacher B, Scaglione M, Toso E, Halimi F, Schade A, Froehner S, Ziegler V, Sergi D, Cesarani F, Blandino A. Incidence of silent cerebral thromboembolic lesions after atrial fibrillation ablation may change according to technology used: comparison of irrigated radiofrequency, multipolar nonirrigated catheter and cryoballoon. *J Cardiovasc Electrophysiol*. 2011;22:961-8.