

CATHETER ABLATION IN ATRIAL FIBRILLATION

O. TECOANȚĂ¹, I. MANIȚIU²¹PhD candidate, "Lucian Blaga" University of Sibiu, ²"Lucian Blaga" University of Sibiu

Keywords: atrial fibrillation, catheter ablation, efficiency, sinus rhythm, quality of life

Abstract: Any sick heart faces an increased risk of atrial fibrillation. Also, people with thyroid problems, diabetes and hypertension are at increased risk for developing this disease. With the older patients, the risk of atrial fibrillation is higher. Atrial fibrillation may result in flat complications, severe enough and also may lead to impaired quality of patients' life. One of the questions posed in the last period and whose response is not fully elucidated is whether catheter ablation is the best antiarrhythmic therapy in atrial fibrillation. Some findings argue for the early use of catheter ablation therapy in the patients with paroxysmal atrial fibrillation unresponsive to the initial attempts with pharmacologic control. Data from the published studies seem to confirm that success over a 12 month-follow up does not necessarily guarantee permanent success and that the early hope of atrial fibrillation ablation is a curative procedure continues to be shattered by the harsh reality that atrial fibrillation does in fact reoccur after several months. Thus, atrial fibrillation seems to have a palliative rather than curative effect at least in most of the patients.

Cuvinte cheie: fibrilația atrială, ablația prin cateter, eficiență, ritm sinusal, calitatea vieții

Rezumat: Orice bolnav de inimă se confruntă cu un risc crescut de fibrilație atrială. De asemenea, oamenii cu probleme tiroidiene, diabet și hipertensiune arterială au un risc crescut pentru apariția acestei boli. Cu cât înaintăm în vârstă cu atât este mai mare riscul de apariție a fibrilației atriale. Fibrilația atrială poate determina apariția unor complicații destul de severe și de asemenea duce la afectarea calității vieții pacienților. Una din întrebările care se pun în ultima perioadă și a cărei răspuns nu este pe deplin elucidat este dacă ablația prin cateter reprezintă cea mai bună terapie antiaritmică în fibrilația atrială. Unele descoperiri argumentează utilizarea ablației cu cateter în tratamentul fibrilației atriale paroxistice care nu răspunde la prima încercare de conversie medicamentoasă la ritm sinusal. Date obținute din studii publicate par să confirme sau mai degrabă să întărească ideea că succesul obținut pe o perioadă de urmărire a pacientului de 12 luni, nu garantează în mod automat succesul permanent, iar speranța actuală că ablația în fibrilația atrială este o procedură curativă continuă să fie năruită de realitatea că această boală recidivează după o anumită perioadă de timp. Astfel ablația ca tratament a fibrilației atriale pare să aibe un efect mai degrabă paleativ decât un efect curativ, cel puțin la majoritatea pacienților.

INTRODUCTION

With the older patients, the risk of atrial fibrillation is higher. As we get older, electrical and structural properties of the atriums are subject to change. This can lead to the disruption of normal atrial rhythm. Any sick heart faces an increased risk of atrial fibrillation. Also, people with thyroid problems, diabetes and hypertension are at increased risk for developing this disease. Obesity may also play a role in the development of cardiac arrhythmias. Atrial fibrillation is more common in people aged over 60. However, people can acquire the disease at any age. Sometimes, atrial fibrillation has no causes for developing this disease but the risk may increase in combination with other heart disease, and may result in flat complications, severe enough and also may lead to impaired quality of patients' life.

One of the questions posed in the last period and whose response is not fully elucidated is whether catheter ablation is the best antiarrhythmic therapy in atrial fibrillation. Individuals with paroxysmal atrial fibrillation who do not respond to at least one antiarrhythmic drug are better treated with radiofrequency catheter ablation than by further attempts of

hythm control with drug therapy, according to a new study lead by Dr David Wilber (Loyola University Medical Center, Maywood) and colleagues, who said that "Catheter ablation provided significant better rhythm control and improved quality of life with a favourable safety profile". These findings argue for the early use of catheter ablation therapy in the patients with paroxysmal atrial fibrillation unresponsive to initial attempts with pharmacologic control.

The study known as the "THERMOCOOL AF trial", included patients who previously failed at least one antiarrhythmic drug and who had experienced three symptomatic atrial fibrillation episodes in the previous six months. 35 % of the patients were previously treated with Sotalol and approximately half with Propafenone, while very few patients were treated with Amiodarone, just 7% were treated with catheter ablation. The researchers report that ablation was associated with the elimination of symptomatic atrial arrhythmia in 70% of the patients and the elimination of any atrial arrhythmia at an end point in 63% of the patients at one year. The quality of life scores significantly improved in the patients treated with ablation compared with those treated by

¹Corresponding author: O. Tecoață, Str Egalității, nr 3, Sibiu, România; e-mail: ovitec2000@yahoo.com; tel +40-0744331901
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further antiarrhythmic drug therapy. Despite inconsistent effectiveness and frequent, cumulative adverse effects with time, antiarrhythmic drugs are generally used to prevent recurrent atrial fibrillation. The likelihood of atrial fibrillation recurrence within 6 to 12 months is of nearly 50% in the patients treated with most antiarrhythmic drugs.

In this study:

- the purpose of the study was to assess the effectiveness of catheter ablation versus antiarrhythmic drug therapy in treating symptomatic paroxysmal atrial fibrillation,
- this was a prospective study performed in 19 hospitals,
- the study sample consisted of 167 patients who had 3 or more atrial fibrillation episodes within 6 months before randomization and who did not respond to at least one antiarrhythmic drug,
- patients were randomly assigned to catheter ablation (106) or to antiarrhythmic drug therapy (61),
- the patients were followed up for a period of 9 months.

This trial showed that catheter ablation was more effective than the antiarrhythmic drug therapy in treating patients with paroxysmal atrial fibrillation who did not respond to one or more drugs. Catheter ablation was associated with significantly better rhythm control and improved quality of life. The safety profile of catheter ablation was favourable. Major adverse events previously reported with ablation including thromboembolic events, atrioesophageal fistula, cardiac perforation, phrenic nerve paralysis and death did not occur in the present study.

In the last decade, several approaches to ablating the trigger and the substrate of atrial fibrillation have been developed. Most studies have reported data only on short or medium term follow up. Another study performed in Italian clinics aimed at investigating whether the 1 year efficacy of catheter ablation for atrial fibrillation was predictive for long term clinical success. The study included 229 patients diagnosed between February 2001 and October 2003 with refractory paroxysmal or persistent atrial fibrillation to the drug treatment and who benefited from a single radiofrequency catheter ablation procedure. Of these patients, 177 (78%) were free from any atrial arrhythmia recurrence 12 months later. These 177 patients were subsequently followed up for at least another 24 months, by means of electrocardiogram and 24h Holter monitoring. After a mean follow up of 36 – 83 months, 58,2% of the patients were free from any atrial arrhythmia recurrence (39,5% without antiarrhythmic drugs). The atrial arrhythmia recurrence rate was:

- 13% at 2 years
- 21,8% at 3 years
- 35% at 4 years
- 46,8% at 5 years
- 54,6% at 6 years

The discovery of the role of the pulmonary veins in initiating and perpetuating atrial fibrillation has led to the ablative treatment of atrial fibrillation. In the last decade, several approaches to ablating the trigger and the substrate of atrial fibrillation have been developed, all of which have proved capable of preventing atrial fibrillation recurrence in up to 80 – 90% of the patients. This disease may lead to the occurrence of physiologic changes of atrial anatomy with age. The aim of this retrospective study was to evaluate whether in the patients with drug refractory atrial fibrillation in whom catheter ablation had prevented arrhythmia recurrence during the first year of follow up, the efficacy of catheter ablation persisted over long term follow up.

Between February 2001 and October 2003, 229

patients affected by drug refractory paroxysmal or persistent atrial fibrillation underwent radiofrequency catheter ablation in three Italian centres. Paroxysmal atrial fibrillation was defined as self terminating atrial fibrillation episodes lasting < 7 days. Persistent atrial fibrillation was defined as atrial fibrillation episodes lasting ≥ 7 days or requiring pharmacological or electrical cardioversion because of intolerable symptoms.

Prior to electrophysiological study, transesophageal electrocardiography was performed in order to exclude left atrial thrombus. All patients received effective oral anticoagulation for ≥ 1 month before ablation. Heparin anticoagulation replaced oral anticoagulants ≥ 72 h before ablation, and was discontinued 4h before the procedure.

All patients were discharged on oral anticoagulants and continued their antiarrhythmic drugs for at least 3 months. Transesophageal and transthoracic echocardiography was performed 3 months later to assess pulmonary veins stenosis, mitral valve function, and left ventricular ejection fraction. Clinical examination, electrocardiogram, and 24h Holter monitoring were performed after 3, 6 and 12 months. The patients in stable sinus rhythm after the first 6 months were encouraged to discontinue antiarrhythmic drugs.

The patients who maintained sinus rhythm with or without antiarrhythmic drugs, for the 12 month-follow up period constituted the study group. These patients continued to be monitored every 6 months by means of outpatient clinical examination, ECG and 24 Holter monitoring for at least another 24 months. The primary objective of the study was to detect any atrial arrhythmias lasting > 30 s, on or off antiarrhythmic drugs, after a single ablation procedure.

This observational retrospective study evaluated the long term outcome of a large series of patients with drug refractory atrial fibrillation who underwent a single catheter ablation procedure. Approximately 40% of the patients who were free from any arrhythmia recurrence 1 year after ablation suffered atrial fibrillation recurrence during the next 3 years. Atrial fibrillation free survival was similar in the patients with paroxysmal atrial fibrillation and in those with persistent atrial fibrillation and in patients on or off antiarrhythmic drugs.

Although catheter ablation of atrial fibrillation has emerged as an important treatment option for the patients with symptomatic atrial fibrillation, its long term safety and efficacy are still unknown. The large number of anatomical and electrophysiological substrates that initiate and maintain atrial fibrillation and their physiological modification with ageing, makes it unlikely that short term success will correlate with long term outcomes.

So far, few studies have investigated what happens after the first 12 months following atrial fibrillation ablation and only three have involved a mean follow up longer than 3 years. Dr. KATRITSIS and colleagues followed up 39 patients suffering from paroxysmal atrial fibrillation for 42 – 48 months after segmental pulmonary veins isolation. Dr. FIALA and colleagues reported the results of a randomized study on paroxysmal atrial fibrillation ablation in 110 patients who were followed up for a mean of 48 – 56 months after ablation.

The periods in which patients were followed up were similar in both studies. In the study of Katritsis, long term success without antiarrhythmic drugs after a single ablation procedure was very poor (8%), whereas Dr Fiala reported that 56% of the patients were free from arrhythmia after the first ablation, without antiarrhythmic drugs. This significant discrepancy cannot be explained in terms of ablation technique, because in Dr Fiala study, the long term success rate was similar in both techniques. Dr. Gaita and colleagues reported a study performed on a 204 patients with symptomatic paroxysmal or

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persistent atrial fibrillation. The results were similar.

In conclusion, data from the published studies and from our experience seem to confirm that success over a 12-month follow up does not necessarily guarantee permanent success and that the early hope of atrial fibrillation ablation is a curative procedure, continues to be shattered by the harsh reality that atrial fibrillation does in fact recur after several months. Thus, atrial fibrillation seems to have a palliative rather than curative effect at least in most of the patients. This fact raises concerns about the risk of discontinuing anticoagulation after the short term success in the patients with risk factors for thromboembolic events. Multiple ablation procedures might increase the free period from atrial fibrillation on long term but it still remains a research hypothesis in future.

BIBLIOGRAPHY

1. Day JD, Crandall BG, Osborn JS et al. Catheter ablation of atrial fibrillation reduces the risk of Alzheimer's disease and dementia. Heart Rhythm Society 2010 Scientific Sessions, May 13; 2010.
2. Day JD, Crandall BG, Osborn JS et al. Atrial fibrillation significantly reduces long-term mortality and strokes in a large patient population. Heart Rhythm Society 2010 Scientific Sessions May 14; 2010.
3. Bunch TJ, Weiss JP, Crandall BG, et al. Atrial fibrillation is independently associated with senile, vascular, and Alzheimer's dementia. Heart Rhythm; 2010.
4. Haïssaguerre M, Shah DC, Jaïs P, Hocini M, Yamane T, Deisenhofer I et al. Electrophysiological breakthroughs from the left atrium to the pulmonary veins. Circulation; 2000.
5. Pappone C, Rosanio S, Oreto G, Tocchi M, Gugliotta F, Vicedomini G et al. Circumferential radiofrequency ablation of pulmonary vein ostia. Circulation; 2000.
6. Marrouche NF, Martin DO, Wazni O, Gillinov AM, Klein A, Bhargava M et al. Phased-array intracardiac echocardiography monitoring during pulmonary vein isolation in patients with atrial fibrillation: impact on outcome and complications. Circulation; 2003.
7. Nademanee K, McKenzie J, Kosar E, Schwab M, Sunsaneewitayakul B, Vasavakul T et al. A new approach for catheter ablation of atrial fibrillation: mapping of the electrophysiologic substrate. J Am Coll Cardiol; 2004.
8. Wazni OM, Marrouche NF, Martin DO, Verma A, Bhargava M, Saliba W et al. Radiofrequency ablation vs antiarrhythmic drugs as first-line treatment of symptomatic atrial fibrillation: a randomized trial. JAMA; 2005.
9. Stabile G, Bertaglia E, Senatore G, De Simone A, Zoppo F, Donnici G et al. Catheter ablation treatment in patients with drug-refractory atrial fibrillation: a prospective, multi-centre, randomized, controlled study (Catheter Ablation For The Cure Of Atrial Fibrillation Study). Eur Heart J; 2006.
10. Oral H, Pappone C, Chugh A, Good E, Bogun F, Pelosi F Jr et al. Circumferential pulmonary vein ablation for chronic atrial fibrillation. N Engl J Med; 2006.
11. Natale A, Raviele A, Arents T, Calkins H, Chen SA, Haïssaguerre M et al. Venice Chart International Consensus Document on Atrial Fibrillation Ablation. J Cardiovasc Electrophysiol; 2007.
12. Calkins H, Brugada J, Packer D, Cappato R, Chen SA, Crijns HJ et al. HRS/EHRA/ECAS expert consensus statement on catheter and surgical ablation of atrial fibrillation: recommendations for personnel, policy, procedures and follow-up. Heart Rhythm; 2007.
13. Fuster V, Rydén LE, Cannom DS, Crijns HJ, Curtis AB, Ellenbogen KA et al. ACC/AHA/ESC; 2006.
14. Guidelines for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation). J Am Coll Cardiol; 2006.
15. Bertaglia E, Stabile G, Senatore G, Turco P, Donnici G, De Simone A, et al. Long term outcome of right and left atrial radiofrequency ablation in patients with persistent atrial fibrillation. Pacing Clin Electrophysiol; 2006.
16. Solheim E, Hoff PI, Off MK, Ohm OJ, Chen J. Significance of late recurrence of atrial fibrillation during long-term follow-up after pulmonary vein isolation. Pacing Clin Electrophysiol; 2007.
17. Does Catheter Ablation Cure Atrial Fibrillation? (printer-friendly) http://www.medscape.com/viewarticle/716964_print; 2010.
18. E.B. received grants for consultancies from Biosense Webster; M.M. and C.T. received grants for consultancies from St Jude. Europace; 2010.
19. Sartini RPJ, Scanavacca MI, Sosa E, Moreira LF, Lara S, Hardy C et al. Radiofrequency ablation of paroxysmal atrial fibrillation: factors determining long term clinical efficacy. Arq Bras Cardiol; 2008.
20. Cheema A, Vasamreddy CR, Dalal D, Marine JE, Dong J, Henrikson CA, et al. Long-term single procedure efficacy of catheter ablation of atrial fibrillation. J Interv Card Electrophysiol; 2006.
21. Katritsis D, Wood MA, Giazitzoglou E, Shepard RK, Kourlaba G, Ellenbogen KA. Long-term follow-up after radiofrequency catheter ablation for atrial fibrillation. Europace; 2008.
22. Shah AN, Mittal S, Sichrovsky TC, Cotiga D, Arshad A, Maleki K, et al. Long-term outcome following successful pulmonary vein isolation: pattern and prediction of very late recurrence. J Cardiovasc Electrophysiol; 2008.
23. Fiala M, Chovancik J, Nevrilova R, Neuwirth R, Jiravsky O, Nykl I et al. Pulmonary vein isolation using segmental versus electroanatomical circumferential ablation for paroxysmal atrial fibrillation. Over 3-year results of a prospective randomized study. J Interv Card Electrophysiol; 2008.