Lifelong Learning

Catheter Ablation for Atrial Fibrillation

Regardless of whether a rate or rhythm-control based management strategy is employed in the treatment of atrial fibrillation (AF), preservation of the brain, in the prevention of stroke with appropriate thromboprophylaxis, remains critical. Catheter-based isolation of the pulmonary veins is an accepted intervention for patients with symptomatic AF, especially when symptoms are severe, paroxysmal or 'lone' AF is present, and when anti-arrhythmic drugs have failed. The prospect of symptom relief should be the driver for AF ablation in most patients.

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia occurring in 1%-2% of the general population. It is likely that several millions more suffer from silent undiagnosed AF. As the prevalence of atrial fibrillation increases, an additional burden on already strained health systems ensues, especially in the developed world with its increasingly aging population. Aside from conferring a significant morbidity and mortality from heart failure, thrombo-embolism and, in particular, stroke, AF leads to significant impairment in quality of life. In patients with symptomatic paroxysmal (intermittent) AF, with no or minimal heart disease, left atrial catheter ablation has been shown, conclusively, in contrast to anti-arrhythmic drug therapy, in multiple single-centre randomised and multicentre prospective studies, to be far superior, at least in the short term as regards a rhythm outcome.

From the Framingham and Rotterdam data it appears the lifetime risks for developing AF are about one in four for men and women aged 40 years or older.

AF is considered as being paroxysmal, persistent or long-standing persistent, based on its presentation and duration and its susceptibility to termination either by drugs or direct current cardioversion. Permanent atrial fibrillation is thought to be such, when its presence is accepted by both patient and physician.

Management strategies are directed at preventing complications and improving quality of life and are essentially based on appropriate thromboprophylaxis, optimisation of ventricular rate control and/or the maintenance of sinus rhythm either by way of anti-arrhythmic drugs or direct-current cardioversion. These classical rhythm control therapies have recently been supplemented with catheter ablation techniques, with the aim of preventing AF.

About the author

Dr RR Gopal, MBChB, *MMed (Int Med) (Stell) (cum laude), Cert Cardiology (CMSA) Interventional Cardiologist and Electrophysiologist. Director of Invasive Electrophysiology, Laboratory and Service Panorama Heart Unit, Cape Town*

Antithrombotic therapy

Antithrombotic therapy often requiring a vitamin K antagonist at present can prevent two thirds of all ischaemic strokes. Risk factor based approaches in non-valvular AF (expressed in acronyms as the CHADSVASC and HAS-BLED scores) help to determine appropriateness of oral anticoagulation (vitamin K antagonists or oral antiplatelet agents) and their associated risk of bleeding. Adjusted dose warfarin is substantially more efficacious in reducing the risk of ischaemic stroke or systemic embolism when compared to aspirin. Dabigatran is a direct thrombin inhibitor which may provide an alternative to warfarin as the preferred orally administered anticoagulant since it does not require frequent blood tests for INR monitoring while offering similar results in terms of efficacy.

Rate control versus rhythm control

No rate control versus rhythm control trial has demonstrated the benefit of rhythm control on mortality expected at its outset (AFFIRM, RACE, PIAF and STAF). However, quality of life is significantly impaired in AF patients compared with healthy controls and post-hoc analyses suggests that maintenance of sinus rhythm may improve both quality of life and be associated with improved survival.

Rate control is a reasonable strategy in elderly patients in whom the level of symptoms related to AF is deemed acceptable. Rhythm control therapy is reasonable to ameliorate symptoms, but should not result in cessation of antithrombotic therapy, rate control therapy, or therapy of underlying heart disease. Furthermore, procedure related complication rates appear to increase in older patients, suggesting that younger patients may be more suitable for catheter ablation.

Catheter ablation

Atrioventricular node ablation and modification

AV node ablation and permanent pacing - 'ablate and pace strategy' - is effective

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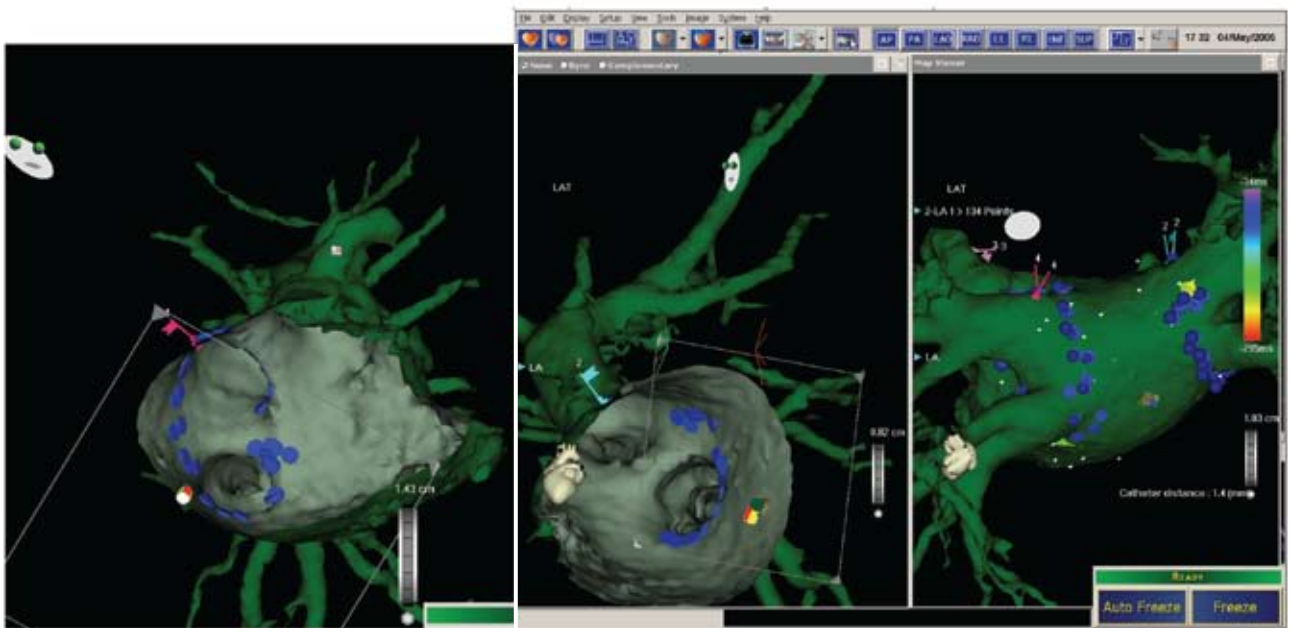

An example of point-by-point RF ablation using Cartomerge technology

for symptomatic relief or rate control (or both) in patients with medically refractory atrial fibrillation or who are unable to tolerate pharmacological treatment. In heart failure patients with treatment refractory AF who require biventricular pacing, AV nodal ablation may be considered earlier to enable adequate biventricular pacing. This strategy seems to improve functional capacity and left ventricular function in these patients.

Catheter ablation to restore and maintain sinus rhythm

The randomised trials available at present, usually performed in high volume centres with ample experience in AF ablation, consistently demonstrate that AF ablation maintains sinus rhythm more effectively than anti-arrhythmic drugs. It cannot be over emphasised that operator experience is an important consideration when considering ablation as a treatment option. The studies cited in support of the recommendations have almost exclusively been performed by highly experienced operators and expert staff working in specialised institutions, but in clinical practice unfortunately more junior and less experienced operators (in particular with regards to lack of formal training and high volume exposure) may be involved in many institutions.

Catheter ablation is usually undertaken in patients with symptomatic paroxysmal AF that is resistant to at least one anti-arrhythmic. Due to the invasive nature of catheter ablation which is associated with rare but potentially severe (0.5%-1%) complications, an initial attempt to prevent AF related symptoms by anti-arrhythmic drug treatment is warranted in many patients.

Improvement in quality of life and reduction of AF related symptoms are at present therefore the only accepted indications for rhythm control therapy in AF patients and hence for catheter ablation. It is imperative to note that no currently available data demonstrate an effect of catheter ablation on AF related complications, for example on stroke, heart failure, or death.

CABANA trial

Catheter ablation versus anti-arrhythmic drug therapy (CABANA), was a phase-three pilot trial designed to test the hypothesis that the treatment strategy of percutaneous left atrial catheter ablation for the purpose of the elimination of AF is superior to current state-of-the-art therapy with either rate-control or anti-arrhythmic drugs for reducing total mortality, disabling stroke, serious bleeding and cardiac arrest (secondary end point) in patients with untreated or incompletely treated AF warranting therapy. There is unquestionably both morbidity and mortality associated with AF ablation, as there is with AF itself. Ongoing randomised trials will conclusively answer whether this is offset by mortality/morbidity benefits associated with attaining and maintaining sinus rhythm.

For patients with either persistent AF or long-standing persistent AF, and no or minimal organic heart disease, the treatment strategies and the risk-benefit ratio of catheter ablation are less well established. Extensive and frequently repeated ablation procedures may be necessary in these patients, and it seems reasonable to recommend that they should be refractory to anti-arrhythmic drug treatment before ablation is considered.

Optimal timing of ablation

There is a tendency for ablation to be performed earlier nowadays with some evidence, aside for that of significant symptomatic benefit, that an earlier intervention may defer or prevent the inevitable cascade towards persistence. Early intervention seems especially suitable in patients with frequent, short paroxysms of AF suggestive of pulmonary vein foci, lack of evidence for structural heart disease, and symptomatic AF

A graphic illustration of cryo balloon ablation using the Arctic Front cryoablation catheter

recurrence despite adequate control of concomitant conditions eg. hypertension, sleep apnoea, alcohol consumption and lifestyle modifications.

Pulmonary vein isolation

Currently the majority of ablation techniques target the elimination of focal pulmonary vein triggers, (which elicit rapid atrial activation) by isolating the pulmonary veins to prevent induction of AF.

Isolation of the pulmonary veins is performed with long, encircling lesions, applied as point by point radiofrequency applications, around the septal (right) pulmonary veins and additionally around the lateral (left) pulmonary veins. This is also referred to as wide circumferential ablation. Several variations of this approach have been developed, reaching from ostial ablation of the pulmonary veins (segmental ostial isolation) which essentially only involve the vein orifices or ostiae to more atrial-sided, antral ablation. All techniques appear to be equally effective in high volume experienced centres.

Cryoablation

Alternative energy sources to RF are single-shot techniques such as laser and cryoablation. These are rapidly gaining widespread acceptance due to acceptable and equivocal efficacy and safety profiles and a considerable diminution in procedural times. Despite the possibility that a degree of conduction recovery between pulmonary vein and left atrium may recur, pulmonary vein isolation prevents recurrences in 70%-80% of patients with paroxysmal atrial fibrillation after a single procedure.

In particular it is pertinent to note that in the setting of RF ablation the post ablation period may herald an array of new tachycardias, in particular macro, re-entrant, left atrial, and isthmus dependant flutters. These may often render the patient considerably more symptomatic than their original AF. Fortunately a large proportion abate spontaneously without specific therapy but their persistence does mandate a repeat procedure to remap in order to define the circuit with the intention to ablate and render the patient symptom free.

Ablation of persistent or long-standing persistent AF

With persistent or long-standing persistent AF concomitant strategies to simple pulmonary vein isolation may need to be deployed. Linear lesions between the lower left pulmonary vein and the mitral annulus can increase the sinus rhythm maintenance rate as well as a roof line connecting the ablation lines around the lateral and septal pulmonary veins, especially in patients with long-standing persistent AF. Achieving complete electrical conduction block at those linear lesions is challenging, but may help to maintain sinus rhythm in selected patients with recurrent AF despite successfully isolated pulmonary veins. One may also aim to ablate CFAEs (complex fractionated atrial electrograms). A combination of pulmonary vein isolation and one or several of these additional ablation techniques, termed 'stepwise approach' to ablation of AF, has been suggested by several experienced groups.

Super Gonorrhoea Bugs Spur New Treatment Regimen in Europe

Zithromax or a generic version of the antibiotic should be added to the standard treatment for Gonorrhoea to fight multidrug-resistant strains of the sexually transmitted bacterium, doctors in Europe said.

New European guidelines for STDs recommend giving azithromycin as well as the injected medicine ceftriaxone, which is beginning to lose its potency against Gonorrhoea. The guidelines also recommend patients be tested after finishing a course of treatment to check they are cured.

The changes, outlined in a report yesterday in the European Centre for Disease Prevention and Control's weekly journal Eurosurveillance, are in response to sporadic cases in which ceftriaxone and a similar antibiotic, cefixime, failed to eliminate Neisseria gonorrhoeae, the microbial cause of Gonorrhoea.

N. gonorrhoeae has developed resistance to all antimicrobial drugs previously used as first-line treatment. The once easily-treated infection is becoming a "major public health challenge," the WHO said in June.