Atrial flutter (AFL) is a distinct arrhythmic entity with a recognizable ECG phenotype resulting from a well-characterized mechanism. AFL usually refers to the “typical” form of AFL, which represents about 90% of patients who present with AFL, and for whom there is a large clinical experience focusing on natural history, long-term risks and treatment options and outcomes. This form of AFL has sometimes also been called “common” AFL or “cavo-tricuspid isthmus (CTI) - dependent” AFL. Typical AFL results from a single reentrant circuit located in the right atrium, revolving around the tricuspid annulus. An area of slow conduction exists in the posterior-inferior aspect of the circuit, with a fully excitable gap. It is believed that most circuits utilize an anatomic or functional obstacle in the posterior right atrium, such as the crista terminalis and inter-caval region.

AFL can be diagnosed from the 12-lead ECG (Figure 1). Classically, there are flutter waves that have a characteristic and constant morphology, polarity and cycle length, with a rate of about 300 bpm or 200 ms. The flutter waves are primarily negative in the inferior leads and may take on a “sawtooth” pattern. The flutter wave is upright in V1 and inverted in V6. Most clinical examples of AFL conduct from atria to ventricles in a 2:1 ratio.
AFL (with no known AF) results in clinical arrhythmia has been typical tion (PVI) in conjunction with AFL prophylactic pulmonary vein isola tion to test the following hypothesis: Flutter: The PREVENT AF Study I”

It will be crucial to establish safety in this context and peri-procedural complications will be a major focus of the proposed trial. If the trial is successful, we anticipate that a new indication for PVI will be established (in the patient with typical AFL), and ultimately endorsed as a bona fide clinical indication in formal guidelines.

The primary aim of this study is to determine whether prophylactic PVI in conjunction with AFL ablation is safe and efficacious for preventing AF recurrence in patients with typical AFL. The study will be conducted at 60 centers in the US and will involve the enrollment of 900 patients with typical AFL. The primary endpoint of the study will be freedom from AF during follow-up, and the secondary endpoints will include procedure-related complications and the need for repeat ablation.

Outcome data suggests that the rate of AF after elimination of AFL increases over time, has consequences for patients including need for repeat ablation (targeting AF) and potential risk of stroke if patients are not anticoagulated (which is the common approach adopted by following physicians). Dr. Steinberg’s recent study found more than half of patients who recurred AF within one year of AFL ablation as documented on implantable loop recorders (1).

In probably the largest study of its kind, investigators recently published data from the Danish health registries including more than 8,000 subjects (2), and found that patients who underwent ablation of AFL had a much higher mortality rate than patients who underwent ablation of AF. The authors speculated that AF following AFL ablation may have increased stroke, heart failure and death rates.

With this background, a prospec tive randomized clinical pilot trial was conducted by Dr. Steinberg and colleagues (3) called “Prophylactic Pulmonary Vein Isolation During Isthmus Ablation for Atrial Flutter: The PREVENT AF Study I” to test the following hypothesis: prophylactic pulmonary vein isolation (PVI) in conjunction with AFL ablation for patients whose only clinical arrhythmia has been typical AFL (with no known AF) results in the reduction of AF in follow-up after ablation. Many more patients in the AFL ablation only group experienced new onset AF, 52% vs 12%, during follow-up over one year (P = 0.005) (Figure 2). The procedure complication rates were similar in both arms.

The reduction of AF in follow-up after ablation. Many more patients in the AFL ablation only group experienced new onset AF, 52% vs 12%, during follow-up over one year (P = 0.005) (Figure 2). The procedure complication rates were similar in both arms. PVI is currently only indicated for patients with symptomatic and established AF and is not indicated to prevent the development of, or progression to, AF. The PREVENT AF II has been designed as the first large-scale trial to test the value of performing PVI before patients have had a clinical diagnosis of AF, i.e. as a prophylactic intervention, and has been approved for review by the NIH.

The trial will be conducted at 60 pre-committed US sites, and under the overall direction of Dr. Steinberg who will serve as the Principal Investigator with the University of Rochester. Substantial support will also be provided by Medtronic and Biosense-Webster.

Recent Publications by the Summit Medical Group Electrophysiologists

- Romanov A, Pokushalov E, Ponomarev D, Strelnikov A, Shabanov V, Losik D, Karasikov A, Steinberg JS. Pulmonary vein isolation with concomitant atrial septal ablation is associated with reduction of both arterial blood pressure and atrial fibrillation burden: data from implantable cardiac monitor. Cardiovasc Ther 2017; e12264.

ArrhythmiaNews

Spring 2018
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The primary aim of this study is to determine whether prophylactic PVI in conjunction with AFL ablation for patients whose only clinical arrhythmia has been AFL (with no known AF) results in the reduction of the composite endpoint of cardiovascular hospitalization, emergency room visit, stroke, or death, whichever occurs first during a mean 18-month follow-up. This is a prospective, multi-center, single-blind, randomized trial in which 900 patients with AFL will be randomized to catheter ablation of the AFL alone (control group) or catheter ablation of AFL plus PVI (study group) (Figure 3).

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AFL is particularly resistant to rate control by medical therapy and poorly responsive to antiarrhythmic drugs, hence the strong interest in ablation as a first-line therapeutic option (Class I in guidelines). Successful ablations are typically heralded by termination of AFL, if ongoing, and the presence bidirectional conduction block across the ablation line (“CTI block”). A meta-analysis of published studies with over 10,000 patients found a procedural success rate of 94%, a 10% recurrence rate, and a complication rate of 2.6%.

The onset of AFL is almost always preceded by AF of variable duration. Antecedent AF helps promote formation of the lateral boundary of AFL between the vena cavae, creating a line of block and thus facilitating a stable macroreentrant circuit, i.e. typical AFL. Many believe that “without AF, there is no AFL.” In this framework, AF serves as the trigger or initiating mechanism of AFL, and the two arrhythmias are inextricably linked.

Although the success rate for isolated AFL ablation is high, it became evident that many patients would have arrhythmia recurrences, usually in the form of AF rather than recurrent AFL. The development of AF would necessitate reinstitution of medical therapy, antiarrhythmic drugs, anticoagulants and consideration of repeat ablation targeting AF in many patients, a sequence of events that would be disquieting and disappointing to the patient who anticipated a curative procedure.

(continued inside)