THE AFIB REPORT

Your Premier Information Resource for Lone Atrial Fibrillation!

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"Atrial fibrillation is widely accepted as a condition of the elderly, however, around half of patients presenting with paroxysmal atrial fibrillation are less than 60 years old." This conclusion was recently reached by a group of French, German, Dutch, Italian and Spanish electrophysiologists. It supports the findings in LAF Survey 9 (December 2005) which revealed that 60% of the over 600 survey participants were diagnosed at or before the age of 50 years. So, if aging is not the major cause of AF, what is?

In this issue an international group of EPs confirms that flecainide is safe and effective, and should be the first choice drug for afibbers with no underlying heart disease. The issue of bleeding risk when on anticoagulants (warfarin) or antiplatelet agents (aspirin, clopidogrel) is finally being addressed with the development of a new scoring system, HAS-BLED, which will allow physicians to better estimate the benefit/risk ratio of antithrombotic treatment. Dabigatran (Pradaxa) may replace warfarin for pre- and post-cardioversion anticoagulation, and continuing warfarin therapy during catheter ablation procedures essentially eliminates procedure-related stroke risk.

And finally, if you need to restock your supplements, please remember that by ordering through my on-line vitamin store you will be helping to defray the cost of maintaining the web site and bulletin board. You can find the store at http://www.afibbers.org/vitamins.htm - your continuing support is truly appreciated.

Wishing you good health and lots of NSR,

Hans

Highlights

New scheme for estimating bleeding risk in afibbers

MAASTRICHT, THE NETHERLANDS. Anticoagulation with drugs such as warfarin (Coumadin) and dabigatran (Pradaxa) and antiplatelet therapy with aspirin or clopidogrel treads a fine line between benefit and risk. While anticoagulation and, to a lesser extent, antiplatelet therapy can reduce the risk of ischemic stroke in atrial fibrillation (AF) patients with coexisting risk factors, these therapies also significantly increase the risk of hemorrhagic stroke and major internal bleeding. While there now are two commonly used schemes ($CHADS_2$ and CHA_2DS_2-VASc) for predicting stroke risk, there is no universally accepted scheme for predicting risk of major bleeding.

A team of researchers from the University of Maastricht and the University of Birmingham has now developed a simple, quite accurate bleeding risk score called HAS-BLED where the letter in the acronym and their assigned risk scores are as follows:

H = Hypertension	1 point
A = Abnormal kidney and liver function	1 point each
S = Stroke (previous ischemic)	1 point

B = Bleeding (previous event/events)	1 point
L = Labile INRs (difficulty maintaining stable INR)	1 point
E = Elderly	1 point
D = Drug or alcohol use	1 point each

The research team applied the HAS-BLED risk score to a group of 3,456 patients with AF without structural heart disease (non-valvular AF). The average age of the group was 67 years and 39% were women. At discharge from hospital, 52% of patients were prescribed an anticoagulant (most likely warfarin), 12.8% were prescribed anticoagulant + aspirin and/or clopidogrel, 24% received antiplatelet therapy (aspirin or clopidogrel) on its own, and the remaining 10.2% received no antithrombotic therapy. The most common reason for prescribing therapy was age over 65 years, although the researchers point out that the biological age of an elderly patient is probably more relevant to bleeding risk than is the chronological age.

During a 1-year follow-up, 52 patients (1.56%) experienced a major bleeding event (requiring hospitalization and/or blood transfusion). The annual risk (%/year) of a bleeding event increased with increasing HAS-BLED score as shown below.

HAS-BLED Score	Bleeds/Patient-year, %
0	1.13
1	1.02
2	1.88
3	3.74
4	8.70
5	12.50

The overall annual bleeding rate was highest for patients treated with anticoagulants (1.75%/year) followed by those receiving no antithrombotic treatment (1.42%/year), and those on antiplatelet therapy alone (0.97%/year). Anticoagulation and antiplatelet therapy is not recommended for afibbers with a $CHADS_2$ score of 0 and thus the HAS-BLED score is not really relevant here. However, in the case of a $CHADS_2$ score of 1, the researchers suggest that the HAS-BLED score must exceed 2 in order for the risk of anticoagulation to offset its benefits. For a $CHADS_2$ score of 2 or higher, they suggest that the risk of bleeding outweighs the potential benefits of anticoagulation if the HAS-BLED score exceeds the $CHADS_2$ score. The researchers acknowledge the limitation of not including INR variation in their evaluation.

Pisters, R, et al. A novel user-friendly score (HAS-BLED) to assess 1-year risk of major bleeding in patients with atrial fibrillation. **Chest**, *Vol. 138, No. 5, November 2010, pp. 1093-1100*

Editor's comment: Anticoagulation and antiplatelet therapy is a double-edged sword, in that benefits and risks must be carefully weighed for the individual patient before being prescribed. Until now, only schemes dealing with stroke risk have been employed with no or little attention paid to bleeding risk. Hopefully, this will change with the widespread use of the HAS-BLED scheme.

Validation of HAS-BLED scheme for predicting bleeding risk

BIRMINGHAM, UNITED KINGDOM. A new scheme, HAS-BLED, was recently developed as a means of predicting bleeding risks in atrial fibrillation (AF) patients receiving antithrombotic treatment. Now a team of researchers from England, Sweden and the United States reports their evaluation of the validity of the scheme in a group of 7,329 AF patients at moderate to high risk of stroke who were anticoagulated with warfarin (3,665 patients) or ximelagatran (no longer available). They compared the HAS-BLED scheme to four other less well known schemes and found HAS-BLED to be superior.

In looking at the actual risk factors in the overall group (warfarin and ximelagatran), they found (in multivariate analysis) that the following factors were independent predictors of an increased risk of bleeding when being anticoagulated.

Concomitant aspirin use – increased bleeding risk by 92%
Kidney dysfunction – increased bleeding risk by 90%
Age 75 years or greater – increased bleeding risk by 71%
Diabetes – increased bleeding risk by 36%
Left ventricular dysfunction – increased bleeding risk by 31%

Applying the HAS-BLED scoring system to the whole patient group resulted in the following annual risk (%/year) of suffering a major bleed when on warfarin or ximelagatran.

	Bleeding Events (%/year)	
HAS-BLED Score	Entire Group	Warfarin Only
0	1.2	0.9
1	2.8	3.4
2	3.6	4.1
3	6.0	5.8
4	9.5	8.9
5	7.4	9.1

The most important risk factors for bleeding events as predicted by HAS-BLED were:

Labile (varying) INR – increased risk by 105% (106%)
Use of aspirin or NSAIDs – increased risk by 85% (96%)
Kidney dysfunction – increased risk by 77% (NS)
Age above 75 years at entry increased risk by 76% (82%)

NOTE: Numbers in brackets indicate risk increases for warfarin group only.

The authors conclude that the HAS-BLED scheme may provide a useful assessment of bleeding risk in AF patients in everyday clinical practice.

Lip, GYH, et al. Comparative validation of a novel risk score for predicting bleeding risk in anticoagulated patients with atrial fibrillation. **Journal of the American College of Cardiology**, *Vol. 57, No. 2, January 11, 2011, pp. 173-80*

Hohnloser, SH. Stroke prevention versus bleeding risk at atrial fibrillation. **Journal of the American College of Cardiology**, *Vol. 57, No. 2, January 11, 2011, pp. 181-83*

Editor's comment: Inadequate control of INR is clearly the most important factor in estimating the risk of bleeding when anticoagulated. Concomitant use of aspirin, kidney dysfunction, and age of 75 years or older are also important factors, although the authors emphasize that, "bleeding in elderly patients with AF is more related to biological age rather than chronological age." It would also seem that it may be wise to add diabetes and left ventricular dysfunction to the factors that can increase bleeding risk. Finally, the huge importance of adequate INR control may make the use of an INR home testing kit a worthwhile investment for afibbers on warfarin.

Use of dabigatran in cardioversion

WYNNEWOOD, PENNSYLVANIA. Dabigatran (Pradaxa) was recently approved as an anticoagulant for atrial fibrillation (AF) patients. A dosage of 150 mg twice daily was found to be superior to warfarin in the prevention of thromboembolism and stroke, while a dosage of 110 mg twice daily was found to be equivalent to warfarin at an INR between 2.0 and 3.0. The incidence of bleeding and gastrointestinal events was similar for warfarin and the 110-mg dose, but higher for the 150-mg dose, especially in patients aged 75 years or older. A group of researchers from Canada, Slovakia, Spain, Sweden and the USA now report on the use of dabigatran prior to and following cardioversion.

The study involved a subgroup of 1,270 patients who underwent cardioversion while participating in the large RE-LY trial (18,113 patients with non-valvular AF) evaluating the efficacy and safety of dabigatran compared to warfarin. The 1,270 patients underwent a total of 1983 cardioversions, 84% of which were electrical. The number of cardioversions performed in the three study groups – dabigatran, 110 mg twice daily (D110), dabigatran, 150 mg twice daily (D150), and warfarin to achieve an INR of 2.0 to 3.0 were similar at 647, 672, and 664.

Transesophageal echocardiography (TEE) was performed in 21% of patients and left atrial appendage thrombi were found in 1.8% of patients

in the D110 group, 1.2% in the D150 group, and 1.1% in the warfarin group. The incidence of stroke and systemic embolism within 30 days of cardioversion was not significantly different in the three groups and neither was the incidence of major bleeding.

	D110	D150	Warfarin
Stroke and systemic embolism	0.77	0.30	0.60
Major bleeding	1.70	0.60	0.60

NOTE: The reason that the differences in the incidence of stroke and bleeding events are not statistically significant relates to the fact that the total number of patients affected was very small (only 11 cardioversions were followed by a stroke or thromboembolism, and only 19 were followed by major bleeding).

There was no difference in the incidence of stroke and systemic embolism between patients who had a TEE prior to cardioversion and those who had not, likely indicating that TEE may not be necessary in patients who have been adequately anticoagulated for at least 3 weeks prior to cardioversion. NOTE: This study was funded by Boehringer Ingelheim, the manufacturer of dabigatran, and all the authors had received grants or consulting fees from the company.

Nagarakanti, R, et al. Dabigatran versus warfarin in patients with atrial fibrillation: an analysis of patients undergoing cardioversion. **Circulation**, *Vol. 123, January 18, 2011, pp. 131-36*

Editor's comment: It would appear that dabigatran is pretty well equivalent to warfarin when it comes to protection against cardioversion-related thromboembolic and stroke events associated with electrical cardioversion. The fact that no INR monitoring is required in the 3 weeks leading up to cardioversion and the 4 weeks following would make dabigatran a convenient and cost-effective alternative to warfarin.

Left atrial appendage – A common AF trigger

AUSTIN, TEXAS. The pulmonary veins are the most important sources of "rogue" cells triggering atrial fibrillation (AF) episodes. Thus, they are routinely isolated from the left atrium in all catheter ablations via the aptly named pulmonary vein isolation (PVI) procedure. In the case of paroxysmal (intermittent, self-terminating) AF, a PVI may be enough to establish permanent normal sinus rhythm, while in the case of persistent and long-standing persistent (permanent) AF, other areas extraneous to the pulmonary veins may need to be ablated as well. Now a team of American and Italian electrophysiologists (EPs) reports that the left atrial appendage (LAA) is also an important site involved in the initiation of AF.

Their study involved 987 patients (29% paroxysmal, 71% persistent or permanent) who needed a second (follow-up) procedure. During the procedure the EPs observed firing from the LAA in 266 patients who then underwent further ablation to isolate these trigger points. The majority (58%) of the 266 patients had permanent AF, 24% had persistent AF, and 18% the paroxysmal variety. LAA firing was defined as consistent premature atrial contractions (PACs) with the earliest activation in the LAA (at least 10 PACs per minute), or as AF or atrial tachyarrhythmia (AT) originating from the LAA.

The 266 patients were divided into three groups where group 1 consisted of 43 patients who underwent a redo of the PVI isolation of the superior vena cava and ablation of complex fractionated atrial electrograms as needed, but no specific ablation involving the LAA. Group 2 consisted of 56 patients who underwent the above-mentioned ablations as needed as well as focal ablation of triggers in the LAA. Group 3 consisted of 167 patients who underwent the same ablation protocol as group 1 plus complete isolation of the LAA in a procedure similar to a PVI.

The patients were followed for 12 months, a which time 74% of group 1 had experienced AF recurrence as compared to 68% in group 2 and 15% in group 3. Of the 95 patients who experienced recurrence, 88 underwent a third procedure involving LAA isolation only. This successfully eliminated recurrence in 93% of patients. All patients were discharged on warfarin and remained on anticoagulation for at least 6 months post-procedure. Patients free of AF recurrence underwent transthoracic (TTE) and

transesophageal (TEE) echocardiography 3 and 6 months after their procedure to determine if contractility and blood flow through the LAA was sufficient to prevent the formation of blood clots (LAA velocity greater than 0.3 m/sec). At the 6-month follow-up, 54% of patients had satisfactory flow velocity and excellent contractility and warfarin was discontinued in these patients. The meaning 46% of patients were kept on warfarin.

Bi Biase, L, et al. Left atrial appendage: An under-recognized trigger site of atrial fibrillation. **Circulation**, *Vol. 122, July 13, 2010, pp. 109-18*

Editor's comment: The observation that the LAA is an important source of AF initiation, particularly in persistent and permanent afibbers, is of significant importance and the finding that AF recurrence can be prevented by electrically isolating the LAA is most encouraging. However, the need for almost half of all patients to continue on warfarin, presumably on a permanent basis, following a LAA isolation may discourage some afibbers from undergoing a LAA isolation procedure.

"Perpetual motion" improves ablation outcome

REDWOOD CITY, CALIFORNIA. Catheter ablation involves a fine balance between creating an effective electrical barrier and avoiding complications such as pericardial tamponade, stroke or TIA, pulmonary vein stenosis, esophageal complications, phrenic nerve injury, and heart block. Radiofrequency ablation for atrial fibrillation (AF) has traditionally used a point-by-point technique where the catheter is held at each point to be ablated for 20 to 45 seconds so as to achieve irreversible coagulation into a scar that will prevent electrical conduction. Older solid catheters needed higher power than newer irrigated (cooled) catheters to achieve effective coagulation and thus their use was associated with an increased number of complications.

Now electrophysiologists at the Sequoia Hospital report that using an open irrigated tip catheter in a "perpetual motion" mode, rather than holding it at a specific point for an extended period of time, results in shorter procedure times, fewer complications, and an improved success rate. Their retrospective study involved 843 afibbers who underwent a total of 1,122 ablations between October 2003 and December 2009. The average age of the patients was 62 years and 28% were female. Most had persistent (50.2%) or paroxysmal (32%) with 17.8% having permanent AF. All patients underwent a circumferential PVI and a left atrium roof-line ablation as well as right and left atrial flutter ablations as needed.

In their analysis the EPs compared procedure time, success rate, and complications in four groups. Group 1 was ablated using a closed tip 8-mm catheter with maximum power setting of 70 W. In group 2 an open irrigated tip catheter (OITC) with a power setting of 40 W was used. Group 3 was treated with an OITC and a power setting of 45 W, and group 4 with an OITC at 50 W and the "perpetual motion" technique. This technique involves moving the OITC back and forth across a small area, staying at one point for only 3 to 10 seconds as opposed to holding the catheter in one position for up to 45 seconds. The small area was "painted" with the catheter until electrical silence was achieved. Outcomes for the four groups are presented in the table below:

	Group 1	Group 2	Group 3	Group 4
Total procedure time, minutes	217	172	149	125
Fluoroscopy time, minutes	112	101	80	63
AF-free survival at one year, %*	39.6	45.2	58.8	59.7
Major complications, %	3.4	1.8	2.1	1.3

*After initial ablation

The "cure rate" or AF-free survival for persistent AF was substantially better in group 4 (60%) than in groups 2 (35%) and 3 (43%), but was not significantly different for paroxysmal AF when comparing the three OITC groups.

The authors conclude that using the "perpetual motion" technique with an OITC at 50 W shortens procedure and fluoroscopy time, and improves outcome of catheter ablation for atrial fibrillation.

Winkle, RA, et al. Atrial fibrillation ablation: "Perpetual motion" of open irrigated tip catheters at 50 W is safe and

improves outcomes. **PACE**, *January 5, 2011 [Epub ahead of print]*

Editor's comment: The idea of "painting" a small area at a time rather than holding the catheter at one point for an extended period of time intuitively makes sense and, according to this retrospective study, results in improved outcome and fewer complications.

Simplified approach to AF ablation

ROME, ITALY. In 1998 Profs. Haissaguerre and Jais at Hopital Cardiologique du Haut Leveque in Bordeaux discovered that the most common sites of ectopic beats triggering atrial fibrillation (AF) are situated in the pulmonary veins. Since then, electrical isolation of the pulmonary veins from the left atrium has become a standard procedure for eliminating AF through catheter ablation. Now a group of Italian electrophysiologists suggests that some less complex supraventricular tachycardias (SVTs) may act as triggers for AF and that their elimination can prevent recurrence of AF, especially in younger patients with paroxysmal AF and no underlying heart disease (lone afibbers).

Their study involved 257 patients (average age of 53 years, 72% male) who had suffered from drug-resistant symptomatic AF for an average of 3.2 years. Seventy-nine patients (30.7%) had paroxysmal AF, 87 patients (34%) had both paroxysmal and persistent AF, and the remainder had persistent AF. It is interesting that 70 patients started out with paroxysmal AF which converted to persistent after an average of 18 months.

All study participants underwent an electrophysiological study during which an attempt was made to induce SVTs other than AF and flutter. The EPs specifically looked for signs of AF triggering by atrioventricular nodal re-entrant tachycardia (AVNRT), atrioventricular re-entrant tachycardia (AVRT) through an accessory pathway, and focal atrial ectopic tachycardia (FAT). Twenty-six patients had inducible SVT (12 AVNRT, 9 AVRT, and 5 FAT). These specific SVTs were successfully ablated in all 26 patients with no further ablations and no complications. The average procedure time was only 78 minutes with fluoroscopy time averaging 16 minutes. No recurrences of the ablated SVTs were observed during a 21-month follow-up, but 2 patients (7.7%) did experience AF recurrence during follow-up.

Patients with inducible SVT were younger than those in which SVT could not be induced (average age 43 years vs 57 years), were much less likely to have heart disease (23% vs 87%), were more likely to have paroxysmal AF (85% vs 25%), and had smaller left atrial diameters (37 mm vs 44 mm). The researchers conclude that a small (about 10%), but important group of afibbers referred for catheter ablation of AF may have inducible SVTs, the successful ablation of which results in an AF-free future in 92% of cases without the use of antiarrhythmic drugs.
Sciarra, L, et al. How many atrial fibrillation ablation candidates have an underlying supraventricular tachycardia previously unknown? **Europace**, *Vol. 12, 2010, pp. 1707-12*

Editor's comment: The finding that AF episodes in a significant proportion of young, lone afibbers with paroxysmal AF may be triggered by previously unknown SVTs is clearly important. Ablation of these less complex arrhythmias is likely to be successful and involves much shorter procedure and fluoroscopy times as well as a very low risk of complications. The observation that 92% of patients with ablated inducible SVT experienced no AF recurrence during a follow-up of 21 months is very encouraging indeed and clearly shows the advantage of an ablation approach "tailored" to the individual patient.

Flecainide is safe and effective

MADRID, SPAIN. Flecainide (Tambocor) is a class 1C antiarrhythmic drug that blocks the inflow of sodium into heart cells thereby slowing conduction through the heart. It increases the atrial effective refractory period (the time span during a heart beat in which AF cannot be initiated). The drug is highly bioavailable in its oral form (90-95% bioavailability) and has a half-life of 12 to 27 hours. Flecainide was first introduced in Europe in 1982, but its acceptance in North America has been very slow

with sales taking a dramatic drop (75%) after the publication of the CAST trial which showed increased mortality among patients who had suffered a heart attack prior to initiating treatment with class 1C drugs (flecainide, propafenone). It is now clear that the increased mortality seen in CAST was caused by pro-arrhythmic events in elderly patients with significant pre-existing cardiovascular comorbidity. Thus, flecainide is now recommended in current guidelines as a first-line treatment option for the conversion of atrial fibrillation (AF) to normal sinus rhythm (NSR) and for the maintenance of sinus rhythm in afibbers with no heart disease and normal left ventricular function.

The progression of AF through more frequent and longer episodes to persistent and, in some cases, permanent AF is caused by electrical and structural remodeling of the atrium. Flecainide helps prevent electrical remodeling by slowing conduction across the myocardium and increasing the refractory period. It helps prevent structural remodeling by reducing calcium ion accumulation in the myocytes and the associated oxidative stress. However, like any drug, flecainide does have the potential for adverse effects. It can initiate atrial flutter and, as it does not slow conduction through the AV node, the flutter may result in 1:1 conduction which is clearly dangerous and highly uncomfortable. The risk of this complication is likely associated with pre-existing, perhaps asymptomatic, right atrial flutter and can be eliminated through a right atrial isthmus ablation. Beta-blockers and calcium channel blockers are also effective in preventing 1:1 conduction. The risk of a pro- arrhythmic event also increases with depressed left ventricular ejection fraction, so flecainide is not recommend for AF patients with this condition.

Nevertheless, the overall safety profile of flecainide, when given to appropriately selected patients, is very favourable with a recent study finding overall mortality in flecainide-treated patients to be lower than the expected rate in the general population. The "official" recommendation is that the oral drug, when first prescribed, should be administered in a hospital setting with a gradual increase from 50 mg twice a day to the maximum dose of 150 mg twice a day (if needed). For patients not able to tolerate high doses or having impaired kidney function, a time-release version is available. Some physicians routinely prescribe digoxin or a beta-blocker with flecainide to avoid the possibility of flutter-induced 1:1 conduction.

Intravenous infusion of flecainide is highly effective in chemically converting acute-onset (less than 48 hours duration) AF and restores NSR within an hour in 95% of patients. There is also evidence that flecainide given prior to electrical cardioversion increases the likelihood of first shocks being successful in converting the patient to NSR (65% conversion vs 30% with placebo). Oral administration is also effective if used soon after episode onset. A single loading dose of 200 to 300 mg converts 50-60% of patients within 3 hours and 75-85% within 6 to 8 hours. Although generally safe in healthy afibbers, reversion to NSR may be preceded by a longish pause in heart beat or, in a small minority (0.2%), in 1:1 conduction, particularly if reversion to NSR happens during exercise. Flecainide is also effective in maintaining NSR after conversion with only a 38% relapse rate (over a minimum 6-month follow-up) as compared to relapse rates of 58% for sotalol and 61% for propafenone.

Long-term therapy with oral flecainide has been shown to significantly reduce the frequency of AF episodes with 65% of patients being responsive to therapy in the short-term and 49% responding in the long-term. There is also evidence that flecainide suppresses palpitations, tachycardia, and episode-associated chest pain.

The group of electrophysiologists, with members form France, Germany, Italy, the Netherlands and Spain, compiling this report concludes that administration of flecainide is a safe and effective option in younger AF patients without co-existing structural heart disease.
Aliot, E, et al. Twenty-five years in the making: flecainide is safe and effective for management of atrial fibrillation. **Europace**, *Vol. 13, 2011, pp. 161-73*

Editor's comment: I have always maintained that AF is not just a disease of the elderly, as is the position of mainstream medicine. In LAF Survey 9 (December 2005), I made the comment, "*With an average age at onset of 48 years, lone AF is clearly not an old age disease, but rather a condition that strikes in what, for most people, is their most productive years. Only 7% of the 619 afibbers in our sample group were diagnosed as late as 65 years of age or older, while 10% were diagnosed before reaching the age of 30 years. A massive 60% were diagnosed at or before the age of 50 years."* It is therefore very gratifying to see that mainstream thinking may be slowly changing as indicated in the following remark from the above article, "*Atrial fibrillation is widely accepted as a*

condition of the elderly; however, around half of patients presenting with paroxysmal atrial fibrillation are less than 60 years old."

Ablation-associated stroke risk eliminated

AUSTIN, TEXAS. Catheter ablation for atrial fibrillation (AF) is associated with an approximately 1% risk of procedure-related ischemic stroke. The risk arises from the formation of blood clots (thrombi) on catheters and sheaths as well as from the stagnation of blood in the left atrial appendage. It is also possible that char formed on catheters due to overheating may be dislodged and carried to the small arteries in the brain where they, like the above-mentioned thrombi, may cause a stroke.

In order to prevent a procedure-related stroke, prospective ablation patients are usually placed on warfarin (INR 2.0-3.0) for two months prior to the procedure. Warfarin is usually discontinued a day or two before the ablation and replaced with heparin, which is also infused during the procedure. After a couple of days "bridging" with heparin, warfarin therapy is reintroduced and the patients are maintained on this for 3 to 6 months post-procedure.

A group of American and Italian researchers now report that not discontinuing warfarin prior to and during the ablation materially reduces the risk of ischemic stroke. Their clinical trial involved 3,966 patients who underwent a pulmonary vein antrum isolation (PVAI) procedure using a 3.5 mm open irrigated radiofrequency-powered catheter. The patients were divided into two groups where group 1 used the conventional warfarin discontinuation approach and group 2 continued warfarin during the procedure. Complication rates for the two groups are presented below.

Complications	Group 1	Group 2
Stroke/TIA	0.9%	0%
Minor bleeding	19.0%	4%
Major bleeding	0.8%	0.4%
Pericardial effusion	0.8%	0.5%

The researchers conclude that continuous warfarin therapy, from 2 months before catheter ablation to 6 months following, is associated with a very low to non-existent procedure-related risk of ischemic stroke. They also point out that patients, in the proper INR range and not experiencing AF on the day of the procedure, do not need a pre-procedure transesophageal echocardiogram (TEE). Although the standard practice is to keep all ablatees on warfarin for 6 months post-procedure, an exception is made for those with symptomatic AF and a $CHADS_2$ score of 0 who are allowed to go off warfarin after 3 months.

Gopinath, D, et al. Pulmonary vein antrum isolation for atrial fibrillation on therapeutic coumadin: special considerations. **Journal of Cardiovascular Electrophysiology**, *Vol. 22, February 2011, pp. 236-39*

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