

# THE AFIB REPORT

*Your Premier Information Resource for Lone Atrial Fibrillation!*

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*Evidence continues to mount to the effect that aldosterone is an important factor in the initiation and progression of atrial fibrillation and that aldosterone receptor blockers (spironolactone and eplerenone) may be useful in preventing it. A group of Japanese researchers reports that eplerenone is effective in preventing relapse following catheter ablation for permanent AF and a fellow afibber reports that spironolactone is keeping his AF under control.*

*Ten years ago I pointed out that digoxin is a very dangerous drug which should never be used by lone afibbers. Cardiologists at Kaiser Permanente in Oakland, CA now support this position after completing a large study that showed afibbers who were prescribed digoxin after their initial diagnosis were twice as likely to die within the following 10 months as were patients not prescribed digoxin. The lead author of the study summed up its findings as "This is a very big deal. We will tell Kaiser physicians not to prescribe digoxin to patients with atrial fibrillation."*

*Also in this issue we report on a new alternative to Holter monitoring, that dental scaling may help prevent AF, that radiofrequency ablation is superior to cryo-ablation in follow-up procedures, that hypothyroidism is associated with AF, and that electrophysiological studies can clearly distinguish between vagal and adrenergic AF – there really is a difference!*

*Last but not least, 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 greatly appreciated.*

*Wishing you good health and lots of NSR,*

**Hans**

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## LETTERS TO THE EDITOR

*It is with great interest that I read your articles on spironolactone, and I thought you might be interested in my story. I am a 65-year-old male and had my first afib episode on September 9, 2011. It lasted 12 hours and was followed by another on November 14 that lasted 10 hours. Then on November 15 I had a massive heart attack which was followed by a third afib episode while in recovery. At discharge I was given the usual slew of medications they give to heart attack patients plus 25 mg/day of spironolactone (Aldactone). During the next 14 months of rehabilitation I did not experience a single skipped beat let alone afib.*

*Eight weeks ago I quit spironolactone due to side effects and as recommended by my cardiologist. Out of nowhere I experienced repeated short bouts of afib on exercise. Now the cardiologist is talking about putting me on amiodarone. I am thinking and saying it must be the spironolactone I am not taking. My cardiologist thinks it is all nonsense. So I put myself back on spironolactone anyway and 5 days after I'm good as new and my exercise level back to my normal. I am seeing another cardiologist in a couple of days. I am on a 24-hour monitor right now and could not exercise myself into afib. Thanks for your awesome insights.*

PB

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Thank you for sharing your experience with spironolactone. Great to hear that it is helping you! I know of at least one other afibber who also was able to control their afib with this drug. However, I do not expect to see it become a mainstream approach in AF management anytime soon. In case continued use leads to breast enlargement or pain, you can switch to eplerenone.

Good luck with your new cardiologist. Perhaps you can induce him/her to read the article "Antiarrhythmic potential of aldosterone antagonists in atrial fibrillation" at <http://www.ncbi.nlm.nih.gov/pubmed/22641540> - the full text is available for free as a .pdf file.

Hans

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*I am currently on metoprolol, hydrochlorothiazide, flecainide and Losartan for high blood pressure and atrial fibrillation. I would like to try the magnesium but am wondering if I should also take potassium along with the Losartan. And should I take taurine? I also have a rapid heart rate while sleeping. I know you can't prescribe but am hoping for some direction. I hesitate to completely stop everything I'm taking but am thinking of adding magnesium in hopes of decreasing the blood pressure and the nighttime rapid heart rate as a beginning.*

SM

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Hydrochlorothiazide makes one excrete potassium in the urine while Losartan, an angiotensin II receptor blocker, prevents excretion. It is very difficult to say if potassium would benefit you without knowing what your current serum level is. Magnesium supplementation would likely be fine provided your kidneys are functioning properly. Some afibbers benefit from taurine while others do not, so you will have to experiment with this. I would suggest to your cardiologist that you try replacing the metoprolol with verapamil or diltiazem. This may help with your nighttime rapid heart rate. You might wish to consider consulting with an electrophysiologist (EP) rather than a cardiologist. An EP is a cardiologist who specializes in the electrical functioning of the heart – much like the analogy of a plumber (cardiologist who unblocks arteries, implants pacemakers, etc) and an electrician.

Hans

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Your site has already saved me from a couple of potentially disastrous errors in trying to find my way with AF. I believe that the best way forward is to try to do everything I can to support my body's healing abilities, while, of course, also considering what the medical profession can offer as well. I am encouraged by the thoughtful and intelligent discussions on the forum and I am deeply grateful for all you have done in support of those of us who have found our lives significantly affected by this vexing problem. It has been very comforting to find so many people who see LAF as a problem that, while resulting in symptoms involving the heart, is complex and more about balance of the complex biochemical and electrical energies of the body and mind.

I am essentially healthy (61 years old), and have been dealing with paroxysmal LAF since 1994. In the past couple of years, the frequency and duration have increased, but I feel that my recent decision to adopt a paleo diet has resulted in some changes that indicate that I am on the right track. My cardiologist has been willing to support me and there are no indications to date of any heart problems from this longstanding condition. I may be a candidate for an ablation in the next year, but I would like to address the underlying issues as much as possible, since there are no guarantees with the procedure.

Thank you Hans – I have been at wit's end at several points with this problem and have found the information at your site empowering and reassuring and, most of all, accurate and up to date.

RG

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## Digoxin doubles mortality among AF patients

OAKLAND, CALIFORNIA. In my first book, *Lone Atrial Fibrillation: Towards A Cure* written 10 years ago, I made the following statement, "Digoxin may truly be the medicine from hell and it certainly should never be used by people with atrial fibrillation." This conclusion was based on research published by arrhythmia experts such as Pr. Philippe Coumel, MD (1994), Dr. Rodney Falk, MD (1997), and Dr. Christian Sticherling (2000). Yet, despite these warnings, prescriptions for digoxin continued to flow unabated with over 60% of participants in the 2002 AFFIRM trial having been prescribed the drug.

Now, 10 years later, cardiologists at Kaiser Permanente report that afibbers prescribed digoxin are twice as likely to die within the first year after diagnosis than are afibbers not prescribed digoxin. Their study involved 23,272 newly-diagnosed atrial fibrillation (AF) patients, 12.9% of whom were prescribed digoxin between January 2006 and June 2009. None of the patients had heart failure (the usual indication for prescribing digoxin). During a 10-month follow-up, 9.5% of patients prescribed digoxin died as compared to 4.3% among non-users. After adjusting for age, race, income, laboratory parameters, prior cardiovascular disease and associated medical procedures, hypertension, cholesterol level, cancer, lung disease, and use of other cardiovascular medications, the researchers conclude that digoxin is associated with a doubling of mortality among AF patients.

In an interview with *Cardiology News* Dr. James Freeman, the lead author said, "This is a very big deal. We will tell Kaiser physicians not to prescribe digoxin to patients with atrial fibrillation".[1]

*Freeman, JV, et al. Digoxin and risk of death in adults with atrial fibrillation. Journal of the American College of Cardiology, Vol. 61, No. 10, March 12, 2013, E262*

[1] <http://www.ecardiologynews.com/news/conference-news/american-college-of-cardiology-2013/single-article/digoxin-linked-to-doubled-mortality-in-atrial-fib/8767f42b2cf20370929018940176779b.html>

**Editor's comment:** This latest warning against prescribing digoxin for AF patients confirms that of an earlier warning issued by Swedish physicians in 2007 who found that otherwise healthy afibbers were twice as likely to die within a year following diagnosis if prescribed digoxin. See [www.afibbers.com/atrial\\_fibrillation/rate\\_control/H88h.htm](http://www.afibbers.com/atrial_fibrillation/rate_control/H88h.htm)

In April 2009 I published an updated report on digoxin ([www.afibbers.org/resources/digoxin.pdf](http://www.afibbers.org/resources/digoxin.pdf)). By this time it was clear that digoxin:

- does not reduce the risk of death from heart failure;
- is associated with a large number of hospital admissions related to digoxin toxicity;
- can cause visual problems, serious skin rashes, and may significantly aggravate asthma;
- increases the risk of invasive breast cancer;
- may cause sinus bradycardia, heart block, and ventricular arrhythmias;
- does not convert AF to normal sinus rhythm;
- does not prevent future AF episodes;
- promotes early recurrence of AF episodes after cardioversion;
- prolongs the duration of AF episodes and may convert paroxysmal to permanent AF.

Yes, digoxin may truly be the medicine from hell – it certainly should never be used by those with lone AF. If a medication is needed for control of heart rate, then calcium channel blockers such as verapamil or diltiazem, or beta-blockers like atenolol, metoprolol or bisoprolol would be better choices – except for vagal afibbers who should not take beta-blockers.

## **Important differences between vagal and adrenergic AF**

TAIPEI, TAIWAN. In 1994 Professor Philippe Coumel of the Lariboisiere Hospital in Paris (who wrote the foreword to my first book) postulated that disturbances in autonomic nervous system (ANS) balance may be involved in the initiation of atrial fibrillation (AF). He coined the terms vagal (parasympathetic) and adrenergic (sympathetic) AF to distinguish between episodes initiated by excessively dominant vagal activity and those initiated by excessively dominant adrenergic activity. He noted that vagal AF is preferentially observed in the absence of detectable heart disease, whilst adrenergic AF is mostly accompanied by heart disease. Vagally-mediated episodes usually occur at night or after rest or a heavy meal when vagal dominance is common. In contrast, adrenergically-mediated episodes occur almost exclusively during daytime and are often associated with physical or emotional stress. However, most AF patients experience random episodes that cannot be clearly classified as either vagal or adrenergic. Whether or not an episode is vagally- or adrenergically-mediated can be ascertained by observing heart rate variability (HRV) about 10 minutes prior to the onset of an episode.

Pr. Coumel warned that beta-blockers and digoxin are contraindicated for patients with vagal AF since they would suppress adrenergic activity and thus exacerbate the ANS imbalance. Unfortunately his findings and warnings were largely ignored by cardiologists and electrophysiologists, particularly in North America. Our 2<sup>nd</sup> LAF Survey reported in March 2001 found that 54% of vagal afibbers were on contraindicated drugs resulting in a very significant increase in their AF burden (episode frequency multiplied by episode duration). A Dutch study published 7 years later found 72% of vagal afibbers were prescribed contraindicated drugs.

Now a group of electrophysiologists at the Taipei Veterans General Hospital further confirm the existence of the two forms of AF and conclude that they are associated with different

electrophysiological properties of the left atrium. Their study involved 190 patients with frequent episodes of symptomatic, paroxysmal AF. During the month prior to a scheduled catheter ablation, all patients underwent 24-hour Holter monitoring to determine if their AF was adrenergically or vagally mediated as indicated by heart rate variability 10 minutes before the onset of an episode.

**Heart rate variability** (the variation in the interval between heart beats) is a powerful indicator of the state of the autonomic nervous system (ANS). The variation in the heart beat interval is usually measured via a 5-minute electrocardiogram or 24-hour Holter monitoring. The original and still commonly used measure for the variation is referred to as SDNN which is the standard deviation of the heart beat intervals, that is, the square root of the variance. Most scientific work on heart rate variability (HRV) now uses power spectral density (PSD) analysis to relate the relatively simple measurement of beat to beat variability to the state of the autonomic nervous system. PSD analysis uses a mathematical technique (fast Fourier transform) to determine how the power (variance in heart beat interval) is distributed across different frequency bands. There is now general agreement that the power in the low frequency band (LF) from 0.04 to 0.15 Hz (cycles/second) is an indication of sympathetic (adrenergic) branch activity and that the power in the high frequency band (HF) from 0.15 to 0.40 Hz is primarily an indication of parasympathetic (vagal) activity. It follows that the ratio of LF/HF is a measure of the balance of the autonomic nervous system with a higher number indicating an excess of adrenergic activity and a lower number indicating an excess of vagal activity.

Thirty of the patients (16%), with an average age of 53 years and 87% male, met the criteria for pure vagal or pure adrenergic AF and were included in the subsequent study. In 12 of the patients the onset of AF episodes were preceded by an increased HF component and a decreased LF/HF ratio. These patients were classified as vagal. In the remaining 18 patients episodes were preceded by a decreased HF component and an increased LF/HF ratio. They were classified as adrenergic. Electrical and structural properties of the atria were evaluated during the ablation procedure and revealed the following differences between the two groups:

- All patients had AF originating from the pulmonary veins (PVs), but vagal afibbers had far fewer non-PV triggers than did adrenergic afibbers (8% vs. 44%).
- Bipolar peak-to-peak voltages (PPV), as measured in the left atrium by electroanatomical mapping (using the NavX system), were substantially higher in the vagal group, whilst the area of low voltage zones (bipolar PPV less than 0.5 mV) was more extensive in the adrenergic group (29% vs. 18%). NOTE: Low voltage zones are likely associated with atrial fibrosis.
- The average volume of the left atrium as determined with a CT scan was significantly smaller in the vagal group.
- There was no difference in electrical or structural properties of the right atrium between the two groups.
- During a 15-month follow-up after a single catheter ablation procedure, 8% of vagal afibbers experienced recurrence as compared to 50% amongst adrenergic afibbers.

The authors conclude that electrical properties and left atrial volume, as well as ablation outcome, are more favourable for patients with vagal AF.

*Lo, L-W, et al. Differences in the atrial electrophysiological properties between vagal and sympathetic types of atrial fibrillation. Journal of Cardiovascular Electrophysiology, January 22, 2013 [Epub ahead of print]*

**Editor's comment:** It is interesting that 84% of the 190 patients originally screened for the study did not exhibit the clear pre-onset HRV change associated with either vagal or

adrenergic AF. In other words, as measured by pre-onset HRV, only 6% of the 190 patients had vagal AF, 9% had adrenergic AF, and the remaining 84% had random (mixed) AF. These numbers are in sharp contrast to the data for 584 afibbers participating in the 2008 Ablation/Maze Survey. Here 33% reported that their AF corresponded to the definition of vagal (occurring during the night, after a heavy meal or after alcohol consumption), 7% reported that their AF indicated an adrenergic association (stress-related), and 60% could not specify their AF as either vagal or adrenergic, and were therefore classified as having random (mixed) AF. In considering this significant difference in classification, it should be kept in mind that the 2008 Ablation/Maze Survey involved lone AF patients only, whilst the Taiwan study included patients with coronary artery disease and heart failure. Thus 25% of the 12 patients classified as vagal and 44% classified as adrenergic had either heart disease or heart failure. This may also help explain the relatively poor ablation outcome for adrenergic afibbers.

## A new alternative to Holter monitoring

PITTSBURGH, PENNSYLVANIA. The reliable detection of abnormal heart rhythms is essential in diagnosis of arrhythmias and in follow-up after catheter ablations or surgery to correct arrhythmias. The most common methods for evaluating heart rhythms are the 12-lead electrocardiogram (ECG), 24-hour Holter monitoring, and patient-activated event recorders. Although each of these methods has proven effective in diagnosing arrhythmias, they are not practical for long term monitoring. Researchers at Harvard Medical School now report the results of a pilot study aimed at evaluating the merits of a new measuring device. The *Zio Patch* (<http://www.irhythmtech.com/zio-solution/zio-patch/>) is a single-use, completely self-contained, noninvasive, waterproof, long-term continuous monitoring patch capable of monitoring heart rhythm for up to 14 days. The patch comes equipped with a trigger button that the patient can press if feeling symptoms of arrhythmia.

The Harvard study involved 74 patients, an average age of 65 years and 55% male, who had been referred for Holter monitoring for the evaluation of paroxysmal atrial fibrillation (AF). Between April 2011 and May 2012 the 74 patients (90% lone afibbers) were simultaneously outfitted with a standard 24-hour Holter monitor and a *Zio Patch* to determine the pattern of AF, document response to medical therapy, and to potentially diagnose other arrhythmias. During the initial 24-hour comparison period, the Holter monitor and the *Zio Patch* both recorded 25 AF episodes and the estimated AF burden associated with these episodes was comparable. After the first 24 hours, Holter monitoring was discontinued but patients continued to wear the *Zio Patch* for as long as possible (average of 11 days). In total, 454 patient days were recorded on the Patch during which time additional AF episodes were detected in 43 patients. In those without AF showing up on an ECG or the 24-hour Holter monitor, the median time to onset of first AF episode was 3.7 days and 90% of first AF events had occurred by day 7.

Overall, 41 patients (55.4%) used the trigger button on the *Zio Patch* because they felt an irregular heart rhythm. Of the total 305 triggered events, most (66%) showed that the patient was in normal sinus rhythm when using the button but 29% correlated with AF, 5% with supraventricular tachycardia, and 1% with pauses. In addition to AF episodes, the *Zio Patch* also identified PACs (supraventricular ectopy) in 24% of patients, PVCs (ventricular ectopy) in 34%, and supraventricular tachycardia in 5% of patients. As a result of completing the *Zio Patch* study, 21 patients had a change in their AF management protocol – most often involving a change in antiarrhythmic medication.

The researchers conclude that the *Zio Patch* is well tolerated and allows for significantly longer, continuous monitoring periods resulting in improved clinical management including the detection of asymptomatic episodes.

Rosenberg, MA, et al. Use of a noninvasive continuous monitoring device in the management of atrial fibrillation. *PACE*, Vol. 36, March 2013, pp. 328-33

**Editor's comment:** The *Zio Patch*, although needing further study, would appear to be a most welcome addition to the methods currently available for heart rhythm monitoring. I found it particularly interesting that, in most cases (66%), when a patient felt irregular heart beats they were actually in normal sinus rhythm. This indicates, perhaps not surprisingly, that there is a major psychological component in AF.

## Eplerenone use in preventing AF recurrence post-ablation

TSUKUBA, JAPAN. In my March 2003 research report *Aldosterone: Villain of the Peace?* ([www.afibbers.org/resources/aldosterone.pdf](http://www.afibbers.org/resources/aldosterone.pdf)), I speculated that excess aldosterone or cortisol was implicated in the initiation of paroxysmal atrial fibrillation (AF) episodes and was also responsible for fibrosis of the heart tissue, eventually leading to persistent or permanent AF. I also suggested that blocking mineralocorticoid (MC) receptors with aldosterone antagonists (spironolactone or eplerenone) may be effective in preventing AF episodes. Now Japanese cardiologists report that the aldosterone antagonist eplerenone (Inspra) is effective in preventing recurrence of AF in patients with permanent (long-standing persistent) AF who have undergone radiofrequency (RF) catheter ablation.

Their clinical trial included 161 patients who had been in sustained AF for anywhere from 1 to 20 years (mean of 3.4 years). The average age was 60 years and 83% were male. Only 12% of the group had structural heart disease, so the majority had lone AF. All participants underwent an extensive RF catheter ablation using the double-Lasso technique and an open-irrigation catheter. A right atrial flutter ablation was also included. Following the procedure, 55 patients were assigned to receive eplerenone (dosage not specified, but likely 25-50 mg/day). In addition, beta-blockers, ACE inhibitors, ARBs (angiotensin receptor blockers), and calcium channel blockers were used equally in the group of 55 patients receiving eplerenone and in the group of 106 patients not receiving eplerenone.

At the end of 24 months of follow-up, 47% of participants were still in normal sinus rhythm (NSR). Those who had been in permanent AF for more than 3 years were significantly less likely to be in NSR as were patients with an enlarged left atrium. Experiencing AF during the first 3 months following the ablation (early recurrence) was also associated with a significantly poorer outcome. Substantially more patients in the eplerenone group (60%) were in NSR after 24 months than in the non-eplerenone group (40%).

The Japanese researchers conclude that eplerenone therapy substantially increases the odds of maintaining NSR after a catheter ablation for permanent AF.

Ito, Y, et al. Effect of eplerenone on maintenance of sinus rhythm after catheter ablation in patients with long-standing persistent atrial fibrillation. *American Journal of Cardiology*, January 19, 2013 [Epub ahead of print]

**Editor's comment:** This study confirms once again the role of aldosterone in AF and that aldosterone receptor blockers are effective in preventing AF.

## Hypothyroidism associated with AF

IOANNINA, GREECE. The thyroid gland produces two hormones, thyroxine (T4) and triiodothyronine (T3). Both of these hormones are iodinated amino acids and it is estimated that the thyroid gland requires an iodine supply of about 100-200 micrograms/day in order to produce them. The production of T3 and T4 is stimulated by the thyroid-stimulating hormone

known as TSH or thyrotropin. TSH is produced in the pituitary gland and its secretion is regulated by the central nervous system via the thyrotropin-releasing hormone (TRH).

Thyroid hormones may act directly on the heart tissue, or can affect the functioning of the heart via the autonomic nervous system (ANS). Both an excess (hyperthyroidism) and a deficiency (hypothyroidism) of thyroid hormones have been linked to atrial fibrillation (AF), but the evidence for a connection with hyperthyroidism (thyrotoxicosis) is much stronger than the evidence for a connection with hypothyroidism. Now physicians at the University of Ioannina report two cases of AF which were clearly associated with subclinical hypothyroidism – hypothyroidism where TSH is elevated but T3 and T4 levels are normal.

The first case involved a 42-year-old woman who presented with brief episodes of non-sustained, paroxysmal AF. Her TSH level was elevated at 5.69 mU/L (reference range of 0.2 to 5.5 mU/L) whilst her T3 and T4 levels were within reference range. She was treated with 50 micrograms/day of levothyroxine and experienced no further AF episodes during a 24-month follow-up. Her TSH also returned to normal.

The second case involved a 45-year-old man who presented with persistent AF. His TSH level was 7.67 mU/L, whilst his T3 and T4 levels were normal. Treatment with 50 micrograms/day of levothyroxine reduced his TSH level to 5.36 mU/L but AF episodes continued. Levothyroxine dose was increased to 100 micrograms/day with the result that, after 6 months, his TSH dropped to 2.48 mU/L. During a further 12-month follow-up, only brief episodes of paroxysmal AF were noted on repeated 24-hour Holter recordings.

The Greek researchers point to three other studies that found a clear association between subclinical hypothyroidism and AF. They conclude that subclinical hypothyroidism may be a risk factor for AF and recommend further studies to elucidate the mechanism connecting the two.

*Kolettis, TM and Tsatsoulis, A. Subclinical hypothyroidism: An overlooked cause of atrial fibrillation? Journal of Atrial Fibrillation, Vol. 5, No. 4, December 2012/January 2013, pp. 6-8*

**Editor's comment:** Hypothyroidism is associated with increased parasympathetic (vagal) activity leading to an unbalanced ANS which, in turn, can initiate AF. Thus treatment with levothyroxine, which is known to increase sympathetic (adrenergic) activity, may result in restoring ANS balance and thereby eliminate this risk factor of AF initiation. NOTE: There is growing evidence that the reference range for normal TSH level is too wide and should be narrowed to 0.2 to 3.5 mU/L, thus "lowering the bar" for the diagnosis of hypothyroidism.

## Dental scaling and atrial fibrillation

TAIPEI, TAIWAN. Periodontitis (inflammation of gum tissue) has been associated with an increased risk of cardiovascular disease and elevation of the systemic inflammation marker C-reactive protein (CRP). Periodontitis is, in turn, associated with poor oral hygiene and can largely be avoided by regular teeth brushing, flossing, and periodic visits to the dentist for a thorough cleaning and dental scaling. Systemic inflammation is also associated with atrial fibrillation (AF), so it is perhaps not too surprising that a group of Taiwanese physicians now report a clear link between poor oral hygiene and the development of AF.

Their study involved 28,900 Taiwanese citizens without a history of cardiac arrhythmia. The average age of the participants was 68 years and 55% were male. The group was followed for 4.6 years during which time 478 participants (2.8%) developed AF. The incidence of new-onset AF in participants who had undergone dental scaling at least once a year for 3 consecutive years (3,391 subjects) was 2.2% as compared to 3.0% in those who had not undergone dental scaling (13,564 subjects).

Other factors associated with the development of AF were congestive heart failure (2-fold increase in risk), coronary artery disease (64% relative risk increase), chronic renal disease (47% relative risk increase), and hypertension (38% relative risk increase). In contrast, just one dental scaling a year reduced the risk of developing AF by 33%, whilst more frequent procedures decreased the risk even further. The Taiwanese researchers conclude that improvements in oral hygiene through dental scaling may be a simple and effective way to reduce systemic inflammation and prevent the development of AF.

*Chen, SJ, et al. Dental scaling and atrial fibrillation. International Journal of Cardiology, February 27, 2013 [Epub ahead of print]*

## AF statistics from Germany

WISMAR, GERMANY. It is by now generally accepted that the incidence and prevalence of atrial fibrillation (AF) is growing rapidly. A group of researchers from various German universities report that as many as 4.4% of men and 3.9% of women can expect to develop new-onset AF within any given year. Their study involved 8.3 million Germans whose health insurance data (doctor's visits and hospital admissions) were examined for the years 2007 and 2008. Those diagnosed with AF were generally unhealthy with 87% having hypertension, 62% having heart failure or vascular disease, and 43% having diabetes – obviously not lone afibbers! Study participants were considered to have developed new-onset AF in 2008 if

- they were free of AF in 2007;
- they did not receive oral anticoagulation in 2007;
- they had been diagnosed with AF in 2008, either in hospital or during at least two doctor's visits.

The overall prevalence (number of people having AF in 2008) was 176,891 or 2.13% of the entire 8.3 million people involved in the study. Both incidence and prevalence of AF were found to increase sharply with age.

Age Group Years	Prevalence, %(1)		Incidence, %/year(2)	
	Male	Female	Male	Female
15 – 49	1.2	0.5	0.5	0.2
50 – 64	6.8	2.9	1.5	0.8
65 – 74	15.0	9.4	2.7	2.0
75 – 84	28.6	22.0	4.7	3.1
85 – 89	17.7	14.0	3.3	3.0

(1) Total number of persons with AF in each age group at any given point in time

(2) Total new cases of AF diagnosed per year in each age group

It is clear from the study that women are substantially less affected by AF than are men and that the incidence (new diagnoses) increases sharply after age 65 for both genders. Based on their data, the researchers estimate that 1.8 million Germans were living with AF in 2009 including 363,000 newly diagnosed that year. They also predict that the number of AF patients in Germany will increase to 2.1 million by 2020 including 426,000 newly diagnosed cases. They conclude that, “in a large industrial nation such as Germany care provision structures are going to be challenged by a requirement to treat more AF patients in the future”.

*Wilke, T, et al. Incidence and prevalence of atrial fibrillation: an analysis based on 8.3 million patients. Europace, Vol. 15, 2013, pp. 486-93*

**Editor's comment:** The German figures for prevalence (2.1%) and incidence (4.1%) are substantially higher than corresponding numbers reported in a 2008 study in Iceland (1.9%

and 2.4%) and considerably higher than those reported in the United States (1% and 1%). It is interesting that, by far, the majority of new-onset AF occurred after the age of 65 in the German study. In contrast, only 7% of the 250 participants in our LAF Survey 14 were diagnosed after the age of 65 years. This adds to the evidence that lone AF is quite a different condition than AF with underlying heart disease. It also clearly shows that an aging population is not a significant driver of the lone AF epidemic.

## **RF is superior to Cryo for follow-up ablation**

NOVOSIBIRSK, RUSSIA. Most catheter ablation procedures use radiofrequency (RF) energy to create the lesions isolating the pulmonary veins (PVs) from the left atrium. However, it is also possible to create the lesions by freezing (Cryo) procedure. The Cryo procedure works by delivering liquid nitrous oxide under pressure through a catheter into a balloon (usually 23 or 28 mm in diameter) placed sequentially in each pulmonary vein. The liquid, when released, changes to gas resulting in cooling and subsequent cell death, thus creating an electrical barrier. Several clinical trials have shown that RF and Cryo procedures are about equally effective in attaining freedom from atrial fibrillation (AF) in patients with uncomplicated paroxysmal AF undergoing a first ablation. However, some patients require redo procedures and there is no data as to which procedure, RF or Cryo, is most effective in follow-up procedures.

A group of physicians from the State Research Institute of Circulation Pathology in Novosibirsk and Columbia University College of Physicians and Surgeons in New York now report their results of comparing the two procedures. The patient population involved in the trial consisted of 80 patients who had failed an initial RF pulmonary vein isolation (PVI) procedure for paroxysmal AF about 8 months prior. The average age of the patients was 56 years and 80% were male. They would appear to have no underlying heart disease (lone AF), but left atrial diameter was somewhat elevated at an average of 47 mm and a maximum of 55 mm.

The patients were randomly assigned to have a follow-up PVI using either RF energy (RF group) or Cryo (Cryo group). Prior to the procedure all participants had a cardiac monitor (*Reveal XT*, Medtronic) implanted so as to be able to determine the AF burden (number of episodes multiplied by their duration in hours) experienced following the procedure. Success was defined as having an AF burden of less than 0.5% (3.6 hours a month) without the use of antiarrhythmics.

The electrophysiologic study involved in the procedures revealed that 72 PVs (average of 1.7/person) had reconnected in the RF group as compared to 77 PVs in the Cryo group (average of 1.9/person). All reconnected veins were successfully isolated. However, to do so required the application of RF energy in 9 PVs in the Cryo group. At the end of a 3-month blanking period, 63% of patients in the RF group and 49% of those in the Cryo group met the criterion of having an AF burden less than 0.5%. Corresponding numbers at the end of the 12-month following were 58% and 43%.

However, when taking into account that some patients in the Cryo group needed RF ablation, the numbers become a little different with those patients receiving Cryo only having a success rate of 38% as compared to 53% in the group receiving RF ablation only, or Cryo plus added RF. At the end of follow-up, 26% of patients (10 in the Cryo group and 11 in the RF group) required antiarrhythmic therapy, whilst 19 patients underwent a third ablation. No complications were observed in the RF group but 3 patients in the Cryo group experienced transient phrenic nerve paralysis. The authors of the report conclude that RF ablation is superior to Cryo when it comes to “redo” procedures.

*Pokushalov, E, et al. Cryoballoon versus radiofrequency for pulmonary vein re-isolation after a failed initial ablation procedure in patients with paroxysmal atrial fibrillation. Journal of Cardiovascular Electrophysiology, Vol. 24, March 2013, pp. 274-79*

**Editor's comment:** It is interesting that the American/Russian team defines success as having an afib burden of less than 0.5%. Most afibbers can live with that, and characterizing failure as experiencing one post-ablation episode lasting longer than 30 seconds, as is currently the norm, does seem a bit unrealistic. This study confirms my own opinion that RF ablation is superior to Cryo, assuming equally skilled operators.

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