THE AFIB REPORT

Your Premier Information Resource for Lone Atrial Fibrillation!

NUMBER 74 **NOVEMBER 2007** **7th YEAR**

Finally, the results of the LAF Survey 14 are here! This survey was designed to determine the "real world" feasibility of materially reducing, or even eliminating, afib altogether through the use of means other than ablation or surgery. A total of 248 afibbers responded to the survey and I would like to thank them for sharing their experiences in "battling the beast".

Special thanks go to PeggyM and GeorgeN who started and maintained "The List" on the LAF Bulletin Board. "The List' is a compilation of the experiences of afibbers who have managed to reduce or completely eliminate their afib. It served as the inspiration for this latest survey.

Almost two-thirds of respondents had been able to reduce or eliminate their afib burden using alternative therapies or pharmaceutical drugs. The other one-third had not been so fortunate, but their experience is still valuable in determining what works and what doesn't. The findings of the survey are summarized in the following review with Appendix A presenting a suggested protocol for afib elimination/reduction based on the findings. There is no guarantee that the protocol will work for everyone, but it is worth giving it a try bearing in mind that we all are "an experiment of one".

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 very much appreciated.

Wishing you good health and lots of NSR,

Hans

LAF SURVEY 14

SUMMARY

The findings and conclusions of LAF Survey 14 are based on the responses from 224 afibbers who had attempted to reduce or eliminate their afib burden through means other than ablation or surgical procedures, and who had been on their program for at least 6 months. More than half the respondents believed they had found a way to materially reduce or completely eliminate their afib episodes. The successful protocols used to eliminate afib were evenly split between the use of pharmaceutical drugs and the use of alternative approaches such as trigger avoidance, supplementation, dietary changes, stress management, and elimination of underlying conditions such as GERD (gastroesophageal reflux disease), sleep apnea and hypoglycemia.

The survey cannot accurately predict what proportion of the total afib population will be able to materially reduce or eliminate their afib through means other than ablation or surgery. Nevertheless, it is likely that a substantial proportion of those who give it a sincere try will be able to substantially improve their condition. A detailed protocol for effective afib reduction/elimination is presented in Appendix A.

INTRODUCTION

LAF Survey 14 was conducted in September/October 2007 and received a total of 248 responses. The purpose of the survey is two-fold:

- To determine the proportion of afibbers who have been successful in managing their afib through means other than ablation or surgical procedures.
- To obtain and share information about successful protocols.

Success in managing afib was defined as a 50% reduction in afib burden over the most recent 6-month period as compared to a 6-month period prior to starting on the protocol that ultimately proved successful. Other terms used in the survey are defined as follows:

- **Afib burden** – The number of episodes over a 6-month period multiplied by their average duration.
- **Paroxysmal LAF** – Episodes occurring intermittently and tending to terminate spontaneously, usually within 48 hours.
- **Persistent LAF** – Episodes lasting longer than 7 days and not terminating spontaneously, but can be terminated with chemical or electrical cardioversion.
- **Permanent LAF** – Constant (chronic, 24/7) afib not amenable to effective termination by cardioversion.
- **Adrenergic LAF** – Episodes occurring almost exclusively during daytime, often in connection with exercise, or emotional or work-related stress.
- **Vagal LAF** – Episodes tend to occur during rest, at night, or following a heavy meal. Alcohol and cold drinks are common triggers.
- **Mixed (random) LAF** – Episodes occur anytime and do not consistently fit the adrenergic or vagal pattern.
- **PAC-Tamer** – Homemade potassium drink. See http://www.afibbers.org/conference/session38.pdf
- **Waller water** – Homemade magnesium drink. See http://www.afibbers.org/Wallerwater.pdf
- **Ectopic beat** – A heartbeat that is initiated at a location other then the sinoatrial node (feels like an extra beat).
- **PAC** – A premature ectopic beat originating in the atrium.
- **PVC** – A premature ectopic beat originating below the atrioventricular (AV) node, often in the ventricular muscle itself.

Statistical Terms

- **N** – Number of respondents in sample.
- **Mean** – The average value for a group of data, i.e. the sum of the values of all data points divided by the number of data points.
- **Median** – The value in the middle of a group of data, i.e. the value above which half of all individual values can be found and below which the remaining 50% can be found.

- **Statistical significance** – In this study average values are considered different if the probability of the difference arising by chance is less than 5 in 100 using the two-tailed t-test. This is expressed as "p" being equal to 0.5 or less. Lower values of p are indicative of a greater certainty that observed differences are truly significant.

All statistical tests were carried out using the *GraphPad Instat* program (GraphPad Software Inc., San Diego, CA).

BACKGROUND OF RESPONDENTS

A total of 248 afibbers (189 males and 59 females) responded to the survey. Their baseline characteristics are presented in Table 1.

Table 1
Baseline Characteristics

Variable	Male	Female	Total
Gender distribution	76%	24%	100%
Median age*	59	60	60
Age range*	26-78	34-80	26-80
Median age at first episode	50	51	50
Age range at first episode	10-75	7-75	7-75
Median no. of years of afib	7	6	7
LAF confirmed by diagnosis	86%	92%	87%
Underlying heart disease	3.7%	1.6%	3.2%
Median weight, lbs/kg	183/83.0	147/66.7	175/79.5
Median height, ft/meters	5'11"/1.80	5'5"/1.65	5'10"/1.78
Median body mass index (BMI)	25.2	23.6	25.1
Median birth weight, kg	3.620	3.365	3.410
Median resting heart rate, bpm	60	68	60
Median blood pressure	120/75	117/70	120/75
Blood type O	42%	39%	41%
Blood type A	37%	41%	38%
Blood type B	15%	10%	13%
Blood type AB	6%	10%	7%

* At time of completing survey

There were no significant differences in the base characteristics between males and females except for the expected differences in weight and height, which were highly significant ($p < 0.0001$). The difference in BMI was also significant, but somewhat less so ($p = 0.04$), as was the difference in birth weight ($p = 0.03$). The difference in resting heart rate, 60 bpm vs. 68 bpm, was very significant at $p < 0.0001$.

Afib Type

A total of 218 respondents had provided detailed information about their type of afib prior to starting their quest to reduce or eliminate their afib burden. The distribution is shown in Table 2.

Table 2
Type of Afib

Type of Afib	Male,%	Female,%	Total,%
Adrenergic	7	6	6
Mixed	32	34	33
Vagal	51	46	50
Total paroxysmal	90	86	89
Persistent	5	2	5
Permanent	5	12	6
Total	100	100	100

Type of afib did not correlate with age at diagnosis, blood type, height, or presence of heart disease. However, a correlation was observed between afib type and weight and BMI with mixed afibbers having a lower weight and BMI than persistent afibbers. Birth weight was significantly higher for permanent afibbers than for mixed and vagal afibbers.

Afib Burden

A total of 190 paroxysmal afibbers had provided data about their episode frequency and duration over a 6-month period prior to beginning their quest to eliminate or reduce their afib burden. This information is summarized in Table 3.

Table 3
Afib Burden

Type of Afib	N	Median No. of Episodes	Median Duration, hours	Median Burden, hours
Adrenergic	12	7	12	164
Mixed	63	15	6	96
Vagal	93	7	6	48
Not known	22	12	5	79
Total paroxysmal	190	10	6	84

Mixed afibbers experienced significantly more episodes over the 6-month period than did vagal afibbers ($p = 0.0002$). Adrenergic afibbers experienced the highest overall burden of afib and this was significantly higher than the burden experienced by vagal afibbers ($p = 0.03$). Paroxysmal afib burden prior to program implementation did not correlate with age at diagnosis, years of afib, weight, height, BMI, birth weight, resting heart rate, blood type, or presence of heart disease.

OVERVIEW OF INTERVENTION PROGRAM RESULTS

A total of 248 respondents participated in the LAF-14 Survey. Of these, 6 (2.4%) had made no attempt to reduce their afib burden by means other than ablation and surgical procedures. Eighteen respondents (7%) had been on their intervention program for less than 6 months leaving 224 respondents for further evaluation. These respondents had been on their program for a median of 36 months.

In answer to the question, "**Did you ultimately find a program that was successful in materially reducing or eliminating your afib burden?**", 144 respondents (64%) answered "YES" and 80 (36%) answered "NO". A total of 29 NO-responders went on to have an ablation/maze procedure, of which, 19 (66%) were deemed to be

successful. Five of the NO responders stated that their intervention program had been partially successful, but they decided to undergo an ablation or maze procedure anyway.

Seven YES responders had undergone an unsuccessful ablation/maze procedure, but had ultimately found a non-ablation, non-surgical approach to manage or eliminate their afib. Another YES responder had managed their afib successfully with drugs, but decided to have an ablation (successful) to be able to discontinue the drugs. Finally, one YES responder had found a successful protocol, but had undergone a maze procedure in connection with open-heart surgery for other heart-related problems.

Among the respondents who had not tried to reduce their afib burden with means other than ablation/surgery, two had undergone a successful ablation, and finally, among afibbers who had been on their protocol for less than 6 months, five had undergone an ablation, of which, two were successful.

Overall, 45 of the 248 respondents (18%) had undergone an ablation/maze procedure with 25 or 56% being successful.

Characteristics of YES and NO Responders

Baseline characteristics of the 224 afibbers who had tried to manage or eliminate their afib for 6 months or longer is presented in Table 4.

Table 4
Baseline Characteristics of YES and NO Responders

Variable	YES Responders	NO Responders
Number in sample	144	80
% female	22.2	22.5
% male	77.8	77.5
Median age*	60	59
Age range*	26-80	35-77
Median age at first episode	51	50
Age range at first episode	7-75	10-71
Median no. of years of afib	6	8
LAF confirmed by diagnosis	85%	93%
Underlying heart disease	3.5%	3.8%
Median weight, kg	79.5	80.2
Median height, meters	1.78	1.80
Median body mass index (BMI)	25.1	24.9
Median birth weight, kg	3.410	3.475
Median resting heart rate, bpm	60	60
Median blood pressure	120/75	120/75
Blood type O	39%	45%
Blood type A	41%	33%
Blood type B	12%	17%
Blood type AB	8%	5%

* At time of completing survey

There were no statistically significant differences in baseline characteristics between YES and NO responders.

Afib Type
The types of afib encountered in the two groups prior to beginning the intervention protocol are shown in Table 5.

Table 5
Afib Type

Type of Afib	YES Responders	NO Responders
Adrenergic	9%	3%
Mixed	27%	45%
Vagal	56%	38%
Total paroxysmal	92%	86%
Persistent	6%	1%
Permanent	2%	13%
TOTAL	100%	100%
Not sure	16 respondents	9 respondents

The difference in percentage of mixed and vagal afibbers (27% vs 45% and 56% vs 38%) between the YES and NO responders was statistically significant ($p = 0.03$). This difference would indicate that vagal afib is comparatively easier to manage than is mixed afib.

Afib Burden
Ninety-six YES responders and 42 NO responders had provided data to allow a comparison of the paroxysmal afib burden experienced prior to the start of the intervention protocol. This data is summarized in Table 6.

Table 6
Afib Burden

Afib Burden*	YES Responders	NO Responders
Median no. of episodes	11	8
Median duration, hrs	6	8
Median burden, hrs	90	78

* during a 6-month period prior to beginning intervention program

There was no significant difference in afib burden prior to program implementation when comparing YES responders to NO responders indicating that initial afib burden, as such, is not a determinant of ultimate success in reducing or eliminating afib.

Intervention Modalities

A summary of the percentage of YES and NO responders who had used different modalities in their quest to relieve or eliminate their afib burden is presented in Table 7. Please not that percentages do not add up to 100 since most respondents had tried more than one modality.

Table 7
Main Components of Intervention Programs

Component	YES Responders	NO Responders	Total
Trigger avoidance	86%	93%	88%
Dietary changes	51%	63%	55%
Supplementation	81%	91%	84%
Drug therapy	79%	78%	79%
Other therapies	51%	61%	55%
Disease treatment	35%	39%	37%
Ablation/maze	6%	36%	17%
Total in group	144	80	224

Most (85%) of NO respondents had tried more than one modality with 46% trying four or more, 21% trying three, and 18% trying two. Among YES respondents 78% had tried more than one modality with 37% trying four or more, 20% trying three, and 22% trying two. Thus, there was no indication that NO responders had been less persistent in their search for a protocol that worked. Of course, it is not possible to conclude anything about the diligence with which the various options were pursued in the two groups.

PROGRAM DETAILS

Trigger Avoidance

A total of 124 YES responders (86%) and 74 NO responders (93%) had attempted to reduce or eliminate their afib through trigger avoidance. The percentage of afibbers who had practiced avoidance of some common triggers is shown in Table 8.

Table 8
Trigger Avoidance

Trigger	YES Responders	NO Responders	Total
Monosodium glutamate MSG	32%	39%	34%
Aspartame	36%	43%	38%
Alcohol	52%	64%	56%
Caffeine	64%	74%	67%
Tyramine-containing foods	5%	11%	7%
High glycemic index foods	22%	24%	22%
Cold drinks	17%	36%	24%
Heavy evening meals	38%	50%	42%
Dehydration	33%	54%	40%
Stress	32%	38%	34%
Physical overexertion	40%	34%	38%
Sleeping on left side	35%	60%	44%
Other	21%	18%	20%
Total in group	144	80	224

Among other triggers avoided wheat, gluten, sugars, bending over, and lack of sleep figured prominently. Caffeine was clearly the most common trigger factor avoided followed by alcohol (especially red wine), sleeping

on the left side, heavy evening meals, dehydration, physical overexertion, and aspartame and other food additives.

Among YES responders 36% believed that trigger avoidance on its own had reduced their afib burden by at least 50% over the most recent 6-month period after beginning the protocol. Another 14% believed it had made little or no difference, and 50% believed that trigger avoidance, in combination with other measures, had resulted in at least a 50% reduction in afib burden. Among NO responders 24% felt that trigger avoidance had improved their condition somewhat, but not by 50% or more.

Over half of all respondents (58%) who had embarked on trigger avoidance had noted other benefits as detailed in Table 9.

Table 9
Other Benefits of Trigger Avoidance

Better overall health	10%
Weight loss	9%
Improved mood, less anxiety, calmer	6%
Fewer ectopic beats	5%
Better sleep	4%
Better digestion, less bloating	4%
More energy, less tired	3%
Fewer colds and infections	2%

NOTE: Percentages are based on the total group of 194 respondents who had practiced trigger avoidance.

Dietary Changes

A total of 74 YES responders (51%) and 50 NO responders (63%) had attempted to reduce or eliminate their afib through diet changes. The percentage of those who had tried various approaches is shown in Table 10.

Table 10
Dietary Changes

Change	YES Responders	NO Responders	Total
Eliminated gluten	11%	16%	13%
Eliminated wheat	13%	15%	14%
Eliminated/reduced dairy	9%	21%	13%
Changed to Paleo diet	8%	11%	9%
Changed to Zone diet	5%	6%	5%
Changed to Atkins diet	1%	1%	1%
Reduced sugar intake	4%	6%	5%
Increased veggies/fruits	0%	6%	2%
Eating smaller portions	3%	1%	3%
Other changes	26%	13%	21%
Total in group	144	80	224

Among the YES responders 30% believed that dietary changes had reduced their afib burden by at least 50% over the most recent 6-month period after beginning the protocol. Another 15% believed it had made little or no difference, and 55% believed that dietary changes, in combination with other measures, had resulted in at least a 50% reduction in afib burden.

Eliminating wheat, eliminating gluten, or switching to the Paleo diet or Zone diet all have one thing in common – the elimination of wheat. Thus, it would be of interest to determine if the baseline characteristics of those afibbers who benefited from wheat elimination are different from those who did not. Twenty-seven respondents had observed no benefit from wheat elimination (including 10 who had switched to the Paleo diet), while 26 respondents had observed a benefit (including 10 who had switched to the Paleo diet). The percentage of vagal afibbers in the successful group was substantially higher than in the unsuccessful group (62% vs. 29%, $p = 0.04$). The percentage of females in the successful group was also substantially higher than in the unsuccessful group (50% vs. 19%, $p = 0.04$). This same ratio also applied to the Paleo diet on its own.

In other words, women (especially vagal afibbers) who try the Paleo diet or wheat elimination are far more likely to be successful than are men. The reason could well be that most women still do the meal preparation and may be more inclined to be strict in their adherence to the diet if they have afib themselves than if it is the husband's problem. Also, men are probably more inclined to ignore the possible benefits of strict adherence and be less diligent.

The fact that vagal afibbers experienced more success with wheat elimination supports the contention that vagal afib is easier to manage than are the mixed, adrenergic, and permanent types. Of course, the possible influence of genetic differences between the sexes cannot be ruled out, but it seems unlikely to be a major cause in the difference in success with wheat elimination.

Any adverse effects from diet changes were minor with the need for adjustment of fiber content being the most significant. Fifty-nine per cent of respondents who had embarked on diet changes felt that their changes had made a significant overall positive impact on their health and wellbeing, quite apart from any effects on their afib. The major benefits are detailed in Table 11.

Table 11
Other Benefits of Dietary Changes

Weight loss	23%
Better overall health	10%
Improved digestion	10%
More energy	8%
Less anxiety and depression	2%

NOTE: Percentages are based on the total group of 124 respondents who had made diet changes.

Supplementation

A total of 117 Yes responders (81%) and 73 NO responders (91%) had attempted to reduce or eliminate their afib burden through supplementation with vitamins, minerals, and herbs. The percentage of those who had tried various supplements and the percentage of those who had found them beneficial are given in Table 12.

Table 12
Supplementation

Supplement	YES responders Tried, %	YES responders Benefit, %	NO responders Tried, %	NO responders Benefit, %	ALL responders Tried, %	ALL responders Benefit, %
Fish oil	68	25	74	7	71	18
Magnesium glycinate	62	71	71	17	65	48
Coenzyme Q10	60	24	60	9	60	18
Potassium	52	21	60	11	55	17
Vitamin C	44	10	56	5	49	8
Vitamin E	44	15	42	6	44	12
B-vitamins	43	18	45	6	44	13
Multivitamin	40	6	42	6	41	6
Taurine	38	51	49	8	43	32
Low-sodium V8 juice	25	34	23	12	24	26
L-carnitine	20	17	29	5	23	11
Zinc	20	4	18	0	19	3
Magnesium oxide	19	41	30	9	23	25
Calcium	18	5	27	0	22	2
Selenium	17	5	19	0	18	3
Probiotics	15	24	26	5	19	14
Digestive enzymes	10	33	19	7	14	19
L-arginine	9	9	15	9	12	9
Sea salt	9	9	16	0	12	4
Melatonin	5	0	8	0	6	0
Waller water	3	25	11	13	6	17
Ribose	3	100	1	0	2	75
Magnesium infusions	2	50	8	0	4	13
PAC-Tamer drink	1	0	3	0	2	0

One or two respondents had found the following supplements beneficial – celery juice, hawthorn, niacin, flax oil, and a lysine/proline combination.

The average number of supplements tried by each respondent was 7. The most popular one was fish oil, which had been tried by 71% of all respondents. Only 25% of YES responders, and 7% of NO responders had found it beneficial as far as reducing their afib burden was concerned. Fish oil supplementation, of course, has many other benefits independent of any effect on afib, most notably, stroke prevention. The second-most popular supplement was magnesium glycinate, which had been tried by 65% of all respondents and found beneficial by 71% of YES responders and 17% of NO responders. Coenzyme Q10 had been tried by 60% of all responders and found beneficial by 18%, while potassium had been tried by 55% and found beneficial by 17%. Taurine had been tried by 43% of all respondents and found beneficial by 51% of YES responders.

Other supplements which had been found beneficial by 50% or more of the YES responders who had tried them include magnesium infusions and ribose; however, as only 3 and 2 respondents had tried them nothing can be concluded about their effectiveness in a larger population, particularly since 6 NO responders had tried infusions and none had found them beneficial. Nevertheless, the ribose results look promising and it is to be hoped that this supplement will receive a more thorough evaluation. Somewhat surprisingly, 19% of YES responders had tried magnesium oxide supplements and 41% had found them beneficial (vs. only 9% among NO responders). This may indicate a placebo effect, or that magnesium oxide is better absorbed than reported in the medical literature. Low-sodium V8 juice, probiotics, digestive enzymes, and Waller water had been found beneficial by 34%, 24%, 33%, and 25% respectively of the YES responders who had tried them.

Among the YES responders 25% believed that supplementation had reduced their afib burden by at least 50% over the most recent 6-month period after starting their protocol. Another 22% believed it had made little or no difference, and the remaining 53% believed that supplementation, in combination with other measures, had resulted in at least a 50% reduction in afib burden. In contrast, 82% of NO responders felt that supplementation had been of no benefit. The remaining 18% felt that they had achieved some benefit, but not enough to reduce their afib burden by 50%. It is of interest that 92% of those claiming some benefit had been supplementing with magnesium. Among YES responders who claimed that supplementation had helped, 56% had been supplementing with magnesium glycinate.

Comparing baseline characteristics of those who had benefited from magnesium glycinate supplementation and those who had not revealed that those who had benefited had experienced afib for only 3 years vs. 7 years for those who had not benefited ($p = 0.04$). This could perhaps indicate that magnesium supplementation is more likely to be successful if started early in one's afib career. There was a strong correlation between having made successful dietary changes and supplementing with magnesium glycinate ($p = 0.04$) and a trend for blood type 0 to be more common among those who had not benefited from magnesium supplementation ($p = 0.06$). Finally, it is worth noting that about 50% of those supplementing with magnesium glycinate also supplemented with potassium and taurine.

Seventeen percent of the 190 respondents had noted adverse effects from taking supplements. The most prevalent of these are listed in Table 13.

Table 13
Adverse Effects of Supplementation

Loose stools and diarrhea*	5%
Upset stomach, bloating	2%
Niacin flush	1%
Carnitine and Q10 causing afib	1%

* Mostly from magnesium supplementation

Among other less frequent adverse effects (mentioned by one respondent each) were an increased frequency of afib or ectopics caused by B-vitamin, potassium + zinc, l-arginine and magnesium.

Thirty-nine percent of the 190 respondents had noted further beneficial effects of their supplementation program. The most prevalent of these are listed in Table 14.

Table 14
Benefits of Supplementation

Increased energy	8%
Better general health	6%
Fewer ectopic beats	6%
Less severe afib symptoms	3%
Cholesterol reduction	3%
Improved digestion	3%
Elimination of leg cramps	2%
Reduction of blood pressure	2%

Other benefits mentioned by one or two respondents included improved mood, better weight control, fewer colds/flu, softer skin (vitamin C), and the heart feeling calmer.

Use of Pharmaceutical Drugs

A total of 114 YES responders (79%) and 62 NO responders (78%) had attempted to reduce or eliminate their afib burden through the use of prescription drugs (antiarrhythmics, beta-blockers or calcium channel blockers). The percentage of those who had tried various drugs and the percentage who had found them beneficial in reducing their afib burden are given in Table 15.

Table 15
Pharmaceutical Drug Use

	YES responders		NO responders		ALL responders	
Drug	Tried, %	Benefit, %	Tried, %	Benefit, %	Tried, %	Benefit, %
Beta-blocker	49	45	55	21	51	36
Flecainide	38	74	39	33	38	60
Sotalol	20	43	24	13	22	32
Calcium channel blocker	20	35	34	19	25	27
Propafenone	17	47	21	15	18	34
Digoxin	14	13	16	10	15	12
On-demand flecainide	13	53	10	33	12	48
ACE inhibitors	12	36	6	0	10	28
Amiodarone	9	70	11	57	10	65
Proton pump inhibitors	8	67	6	25	7	54
Tranquilizers	7	50	11	43	9	47
Disopyramide	6	43	0	0	4	43
Rythmol SR	6	29	10	33	7	31
On-demand propafenone	5	50	5	0	5	33
Angiotensin II blockers	4	60	5	0	5	38
Antidepressants	4	25	5	0	4	14
Dofetilide	3	67	5	33	3	50
On-demand beta-blocker	3	0	10	17	5	11
Aldosterone blockers	1	100	2	0	1	50
Procainamide	1	0	2	0	1	0

The average number of drugs tried by each respondent was 2.5 and there was no indication that NO responders had tried fewer drugs than had YES responders. The most popular drugs were beta-blockers, which had been tried by 51% of all respondents and found beneficial by 36% (Yes responders 45%, NO responders 21%). The second-most popular drug was flecainide (Tambocor), which had been tried by 38% and found beneficial by 60% (74% among YES responders and 33% among NO responders). In third place came calcium channel blockers, which had been tried by 25% and found beneficial by 27% (35% among YES responders and 19% among NO responders). Sotalol (Betapace) had been tried by 22% of all respondents and 32% of them had found this drug beneficial (43% of YES responders and 13% of NO responders). Amiodarone had been tried by 10% of all respondents and had been found beneficial by 65% (70% of YES responders and 57% of NO responders). Although only tried by 7% of respondents, proton pump inhibitors (omeprazole, etc) had been found effective by 54%. Finally, 6 respondents had tried dofetilide (Tikosyn) with half of those finding it beneficial.

Beta-blockers and propafenone (Rythmol) were the most effective drugs for adrenergic afibbers; for mixed it was dofetilide (Tikosyn), propafenone, amiodarone, and flecainide that were the most effective, while for vagal afibbers amiodarone, flecainide, and calcium-channel blockers were most effective. The most effective drug overall was amiodarone, while the least effective was digoxin (Lanoxin). Somewhat surprisingly, 30% of vagal afibbers who had tried beta-blockers on a continuous basis had found them effective. NOTE: Half of them were taking the beta-blocker in combination with flecainide or amiodarone.

One respondent had eliminated his afib by correcting a low serum potassium level (3.2 mEq/l) with 50 mg/day of the aldosterone blocker, eplerenone, plus 2000 mg/day of potassium. He also took 50 mg of flecainide before bedtime. This protocol brought his potassium level up to 4.2 mEq/l.

Among the YES responders 56% believed that the use of prescription drugs had reduced their afib burden by at least 50% over the most recent 6-month period after beginning their protocol. Another 19% believed it had made no difference, and the remaining 25% believed that the use of drugs, in combination with other measures, had resulted in at least a 50% reduction in afib burden.

Thirty-five percent of the 176 respondents had noticed adverse effects from their medications. The most prevalent of these are listed in Table 16.

Table 16
Adverse Effects of Drugs

Tiredness, fatigue	15%
Hypotension (low blood pressure)	3%
Sexual dysfunction	2%
Constipation	2%
Increase in ectopics	2%
Thyroid problems*	1%
Headaches	1%
Dizziness/lightheadedness	1%
Problems with sleeping	1%
* Associated with amiodarone	

Flecainide users (34%) were the most likely to report adverse events followed by amiodarone (29%) and sotalol (26%) users.

Eleven percent of the 176 respondents had noted further benefits from their medications. These are listed in Table 17.

Table 17
Additional Benefits of Drugs

Reduction in blood pressure	4%
Fewer ectopic beats	2%
Lower heart rate	2%
Fewer migraine attacks	1%
Decrease in GERD symptoms	1%
Calmer	1%

Use of Alternative Protocols

A total of 74 YES responders (51%) and 49 NO responders (61%) had attempted to reduce or eliminate their afib burden through the use of stress management or other alternative therapies. The percentage of those who had tried various protocols and the percentage who had found them beneficial in reducing their afib burden are given in Table 18.

Table 18
Alternative Therapies

	YES responders		NO responders		ALL responders	
Alternative Therapy	Tried, %	Benefit, %	Tried, %	Benefit, %	Tried, %	Benefit, %
Relaxation therapy	39	52	43	10	41	34
Breathing exercises	38	57	47	17	41	39
Acupuncture	15	18	18	0	16	10
Chiropractic	5	25	4	0	5	17
Chinese herbal medicine	7	40	12	0	9	18
Meditation	32	42	27	23	30	35
Yoga	20	60	16	38	19	52
Qi Gong	5	75	6	33	6	57
Tai Chi	5	50	6	0	6	29
Cognitive thinking therapy	12	67	8	0	11	46
Amalgam removal/detox.	14	50	6	0	11	38

It was mostly adrenergic afibbers who benefited from relaxation therapy.

Relaxation therapy had been tried by 41% of respondents and found beneficial by 34% (mostly adrenergic afibbers). Breathing exercises had also been tried by 41% and found beneficial by 39%. Meditation had been tried by 30% and found beneficial by 35%. The most effective therapy was Qi Gong, which had been tried by 6% of respondents and found beneficial by 57%. Yoga and cognitive thinking therapy were also found effective at 52% and 46% success rates respectively.

Among the YES responders 19% believed that the use of stress management and other alternative therapies had reduced their afib burden by at least 50% over the most recent 6-month period after beginning their protocol. Another 28% believed it had made no difference, and the remaining 53% felt that the use of alternative therapies, in combination with other measures, had resulted in at least a 50% reduction in afib burden.

Only 2 respondents (2%) reported adverse effects of their alternative therapy program and both were related to vigorous exercise. In contrast, 26% of respondents who had tried alternative therapies reported additional benefits over and above the effect on afib burden. The most prevalent of these benefits were an increased sense of mental and physical wellbeing (7%), feeling calmer and more relaxed (7%), more flexible due to yoga training (3%), and more energy (2%).

Treatment of Underlying Diseases

A total of 52 YES responders (36%) and 30 NO responders (38%) had attempted to reduce or eliminate their afib burden by dealing with underlying disease conditions. Table 19 shows the most prevalent conditions dealt with and the degree of success attained in doing so.

Table 19
Elimination of Diseases

Disease	YES responders Tried, %	YES responders Benefit, %	NO responders Tried, %	NO responders Benefit, %	ALL responders Tried, %	ALL responders Benefit, %
GERD	42	41	43	0	43	26
Digestive problems	33	53	47	0	38	29
Food allergies	12	50	13	0	12	30
Sleep apnea	21	27	13	0	18	20
Hyperthyroidism	2	100	3	0	2	50
Hypothyroidism	10	20	10	0	10	13
Hypoglycemia	10	20	3	0	7	17

Other conditions treated were constipation, tooth abscesses, hypokalemia (one each).

GERD (gastroesophageal reflux disease) and digestive problems affected a total of 36 or 44% of the 82 respondents. Half of them (22%) had reduced their afib burden by effectively dealing with these conditions. Sleep apnea affected 18% of respondents and was dealt with successfully in 20% of cases. Food allergies were reported by 12% and effectively treated by 30%.

Somewhat surprisingly, only about 10% of GERD patients had used proton pump inhibitors (Nexium, Prilosec) in treating their problem. The remaining had used diet (58%) or probiotics and digestive enzymes (33%) to help alleviate GERD. Sleep apnea sufferers were generally overweight or obese and most had used a CPAP machine to alleviate their problem.

Among the YES responders 35% believed that dealing with underlying disease conditions had reduced their afib burden by at least 50% over the most recent 6-month period after starting their regimen. Another 21% believed it had made no difference, and the remaining 44% felt that dealing with underlying conditions, in combination with other measures, had resulted in at least a 50% reduction in afib burden. In contrast, 83% of NO Responders felt that attempting to deal with their underlying conditions had made no difference.

An impressive 63% of the 82 respondents who had dealt with underlying disease conditions in an attempt to reduce their afib burden had observed additional benefits, the most common of which are summarized in Table 20.

Table 20
Additional Benefits from Treatment of Underlying Disease Conditions

Improved digestion and bowel function	17%
No more acid reflux (heartburn)	17%
Better sleep	16%
Overall better health and wellbeing	6%
More energy	4%
No more fluctuations in blood sugar	4%
Weight loss	4%

Ways of Shortening Episodes

A total of 110 respondents (49% - YES and NO respondents combined) had found one or more ways of shortening their episodes. The number and percentage of those who had found effective protocols are presented in Table 21.

Table 21
Means of Shortening of Episodes

Effective Protocol	Number	Percent
On-demand flecainide	27	25
Light exercise	26	24
Resting	23	21
Vigorous exercise	19	17
On-demand beta-blocker	17	15
Tranquilizers	11	10
On-demand propafenone	11	10
Hydrotherapy	9	8
Meditation	8	7
Valsalva maneuver	7	6
Increase supplements*	7	6
On-demand calcium channel blocker	5	5
Acupuncture/acupressure	3	3
Increase regular medication	3	3
Drinking lots of water	3	3
Stand up (if episode starts when resting)	2	2
Coughing	2	2
Sleeping in cool room	2	2
Warm bath	1	1

* Especially magnesium, taurine and potassium

Twenty-five percent of the 110 respondents had found the on-demand (pill-in-pocket) approach with flecainide to be effective in hastening conversion to normal sinus rhythm. This approach was equally effective for mixed and vagal afibbers, but significantly more effective for YES responders than for NO responders.

Twenty-four percent had found light exercise to be effective, 23% had benefited from resting (equal benefit for all afib types), 19% from vigorous exercise, 17% from on-demand beta-blockers, and 11% from tranquilizers. The most effective therapies for women were hydrotherapy, meditation, tranquilizers and resting, while the most effective therapy for men was vigorous exercise. NOTE: 80% of respondents who had found vigorous exercise beneficial were male, vagal afibbers.

Ways of Prevention Ectopics

Sixty-eight respondents (33%) had found one or more means of preventing ectopics (premature beats, PVCs, PACs), 21% did not experience ectopics, and the remaining 46% had not found a way of preventing ectopics. The number and percentage of respondents who had found effective protocols are presented in Table 22.

Table 22
Prevention of Ectopics

Effective Protocol	Number	Percent
Supplementation with magnesium*	30	44
Supplementation with potassium*	29	43
Low-sodium V8 juice	18	26
Supplementation with taurine*	16	24
Beta-blocker	10	15
Tranquilizers	7	10
Additional supplements**	7	10
Additional antiarrhythmics	4	6
PAC-Tamer drink	1	1

* Mostly in combination (magnesium/potassium/taurine)
** Specifically potassium and coenzyme Q10

By far the most effective way of preventing ectopics is by supplementing with magnesium and/or potassium, preferably in combination with taurine. Forty-four percent of all respondents had found this approach to be effective, while 26% had found drinking low-sodium (high potassium) V8 juice to be effective in preventing ectopics. Beta-blockers and tranquilizers were also found to be somewhat effective. In my own experience the most effective way of preventing or eliminating ectopics is by drinking (over a 10-minute period) 8 ounces of lukewarm water containing the following:

- 1 pouch of *Emergen-C*
- 1 teaspoon of magnesium citrate (*Natural Calm*)
- 1 teaspoon of potassium gluconate
- 1000 mg of taurine (may be taken separately in capsule form)

This drink will provide, besides 1000 mg of vitamin C, 740 mg of elemental potassium and 265 mg of elemental magnesium in a highly absorbable form.

Other suggestions for preventing ectopics include avoiding trigger factors such as caffeine, sugar, and sleeping on the left side.

Overall Results of Intervention Protocols

One hundred and forty-four respondents (64% of the total) answered YES to the question, "**Did you ultimately find a program that was successful in materially reducing or eliminating your afib burden?**" The average time these respondents had been on their successful program varied from 6 to 120 months with a median of 22 months. Ninety-one YES responders had kept track of the number of episodes and duration during their time on the program as well as before they started. Results are compared in Table 23.

Table 23
Overall Results

Burden over 6 months	Before Protocol	After Implementation
No. of episodes	10	0.8
Average duration, hrs	6	1
Afib burden, hrs	72	2

NOTE: Permanent afib is counted as 24 hours a day for 180 days, ie. 4320 hours over 6 months.

The differences in the two columns were all statistically extremely significant. Perhaps even more impressive is the fact that almost a third of the 91 respondents had experienced no episodes at all since implementing their protocol. Nevertheless, 45 of the respondents still needed to avoid triggers, while 30% did not. The remaining 25% still needed to avoid triggers, but much less so.

Ninety-five percent of respondents would recommend their program to fellow afibbers, but 5% would not, primarily because their programs involved the use of amiodarone or drastic measures such as early retirement.

Overall, 157 respondents who had not undergone ablation and had been on their program for 6 months or longer had kept records of their afib burden prior to implementing their program and for the most recent 6 months while on the program. These respondents can be assigned to 4 different groups:

- Worsened or no improvement 40 respondents
- Less than 50% improvement 11 respondents
- Better than 50%, but not eliminated 57 respondents
- No episodes in most recent 6 months 42 respondents

In addition, 7 persistent afibbers either completely eliminated their afib (4 respondents) or became paroxysmal. Thus, out of the group of 157 respondents with complete data, 68% had reduced their afib burden by 50% or more, and 29% had experienced no episodes in the most recent 6 months.

It clearly would be of interest to determine the relevant differences between the group of 46 respondents (Group A) who managed to completely eliminate their afib for at least a 6-month period (including former persistent afibbers) and the group of 40 respondents (Group B) whose condition worsened or remained the same. To do so is the purpose of the following section.

COMPARISON BETWEEN GROUPS A AND B

In this section the baseline characteristics and actions taken will be compared for a group of 46 afibbers (Group A) who experienced no afib episodes over the latest 6-month period and a group of 40 afibbers whose condition worsened or remained the same (Group B).

Table 24
Comparison of Baseline Characteristics

Variable	Group A	Group B
% female	24	33
% male	76	67
Median age @completion	60	58
Age range @ completion	33-77	40-77
Median age at first episode	50	52
Age range at first episode	16-69	20-71
Median no. of years of afib	7	7.5
LAF confirmed by diagnosis	89%	93%
Underlying heart disease	4.8%	2.5%
Median weight, kg	81.6	78.8
Median height, meters	1.78	1.80
Median body mass index (BMI)	25.8	25.0
Median birth weight, kg	3.280	3.700
Median resting heart rate, bpm	60	62
Median blood pressure	120/75	120/73
Months on program	36	48
Blood type O	39%	47%
Blood type A	42%	30%
Blood type B	14%	17%
Blood type AB	5%	6%
Adrenergic	10%	3%
Mixed	24%	42%
Vagal	63%	45%
Paroxysmal	98%	90%
Permanent	2%	10%
Total	100%	100%

There were no statistically significant differences in baseline characteristics between the two groups except for median birth weight which was almost a pound (420 grams) higher in Group B.

The afib burden 6 months prior to beginning the protocols and for the most recent 6-month period are shown in Table 25.

Table 25
Afib Burden

	Before Intervention		After Intervention	
Afib Burden	Group A	Group B	Group A	Group B
Median no. of episodes	4	6	0	24
Median duration, hrs	6	8	0	12
Median burden, hrs	33	56	0	208

There was no statistically significant difference between the pre-intervention afib burden of Groups A and B. However, the difference in pre- and post-intervention burden was highly significant for both groups with Group B getting much worse and Group A eliminating afib altogether, at least for a 6-month period.

Intervention Modalities

A summary of the percentage of Group A and B members who had used different modalities in their quest to relieve or eliminate their afib burden is presented in Table 26. Please note that percentages do not add up to 100 since most respondents had tried more than one modality.

Table 26
Main Components of Intervention Program

Component	Group A	Group B
Trigger avoidance	85%	93%
Dietary changes	41%	70%
Supplementation	70%	90%
Drug therapy	72%	75%
Other therapies	54%	63%
Disease treatment	41%	36%

There was no indication that members of Group B had tried fewer interventions than had those of Group A – quite the contrary. Most surprising was the finding that only 41% of those in Group A had made dietary changes as compared to 70% in Group B ($p = 0.02$). Trigger sensitivity was not significantly different between the two groups, except that those in Group B had found sleeping on the left side to be more detrimental than had those in Group A (53% vs 28%, $p = 0.05$).

Dietary Changes

Seventy percent of Group B and 41% of group A had tried changing their diet. The percentage of those having tried different approaches and their rate of success is presented in Table 27.

Table 27
Dietary Interventions

	Group A		Group B	
Intervention	% Tried	% Success*	% Tried	% Success*
Elimination of gluten	13	33	20	0
Elimination of wheat	13	33	18	0
Reduced dairy	11	60	20	0
Changed to paleo diet	9	75	5	0

* % of those who had tried the intervention and believed it had reduced their afib burden by 50% or more.

There clearly was a substantial difference in the degree of success experienced in the two groups. Group B had no luck at all, while Group A found that diet changes had reduced their afib burden by 50% or more in from 33 to 75% of cases. The major difference between the two groups was that there were no mixed afibbers in Group A, while the proportion of mixed afibbers in Group B was 55%. It was also noted that 75% of Group A members who had found diet changes beneficial were women.

Supplementation

Ninety percent of Group B and 70% of Group A had tried supplementation. The percentage of those having tried different supplements and their rate of success is presented in Table 28.

Table 28
Supplement Interventions

	Group A (N=46)		Group B (N=40)		Total	
Supplement	Tried, %	Benefit, %	Tried, %	Benefit, %	Tried, %	Benefit, %
Magnesium glycinate	39	67	81	21	55	38
Magnesium infusions	2	100	6	0	3	33
Potassium	28	54	58	5	40	24
Taurine	20	67	50	0	31	22
Magnesium oxide	20	44	28	0	22	21
Low-sodium V8 juice	7	67	22	0	13	18
Digestive enzymes	13	33	14	0	13	18
Coenzyme Q10	37	24	67	13	48	17
Fish oil	48	23	75	7	57	14
Probiotics	11	0	28	0	17	0

The most beneficial supplement was magnesium glycinate (chelated magnesium), which had been tried by 55% of all 86 responders and found beneficial by 38%. Thirty-nine percent of Group A had tried magnesium glycinate and two-thirds had found this supplement beneficial. Potassium and taurine were also found to be effective with 24% and 22% of those having tried them finding them beneficial (54% and 67% respectively in Group A). Fish oil was the most popular supplement, but only 14% (23% in Group A) had found it beneficial as far as afib was concerned.

It is not surprising that magnesium turned out to be highly beneficial. Magnesium has proven antiarrhythmic properties and magnesium sulfate injections have been found to shorten episode duration. It is also worth noting that 80% of the US adult population (excluding those who supplement) do not get the recommended daily allowance of 420 mg/day for men and 320 mg/day for women from their diet.[1] Furthermore, there is also evidence that magnesium intake is inversely proportional to the level of the inflammatory marker C-reactive protein.[1] This all adds up to the conclusion that magnesium is likely the most effective supplement for lone afibbers. It also points to the possibility that the massive extent of magnesium deficiency in the USA, and likely in Canada and western Europe as well, may be at least partly responsible for the afib epidemic.

In the experience of many afibbers a combination of magnesium, potassium, and taurine is even more effective than magnesium alone. A commonly used combination is:

- 3 x 100-200 mg/day of elemental magnesium from magnesium glycinate
- 3 teaspoons/day of potassium gluconate powder providing 3 x 540 mg/day of elemental potassium
- 3 x 1000 mg/day of taurine

When the above combination is first started it is a good idea to begin just with magnesium and taurine as there is evidence that it is difficult to remedy a low potassium level without first ensuring an adequate level of magnesium. Also, it is advisable to gradually increase magnesium over a couple of weeks (3x100 mg/day to 3x200 mg/day) so as to avoid any stomach upset. The above supplements are best taken in juice or in a protein shake. NOTE: *Natural Calm* magnesium citrate can also be used, but needs to be started slowly to avoid loose stools.

[1] King, DE, et al. Dietary magnesium and C-reactive protein levels. J*ournal of the American College of Nutrition,* Vol. 24, No. 3, 2005, pp. 166-71

Coenzyme Q10 had been tried by 48% of all respondents and found beneficial by 17% (24% in Group A). However, some afibbers have found that coenzyme Q10 is too excitatory and worsens their condition. Experimentation is definitely required here.

Pharmaceutical Drugs

Seventy-five percent of Group B and 72% of Group A had tried pharmaceutical drugs. The percentage of those having tried the various drugs and their extent of success is presented in Table 29. NOTE: Only drugs, which had been tried by at least 5% of the total group, are included here.

Table 29
Pharmaceutical Interventions

	Group A		Group B		Total	
Drug	Tried, %	Benefit, %	Tried, %	Benefit, %	Tried, %	Benefit, %
Amiodarone	7	100	3	100	5	100
Tranquilizers	7	33	8	100	7	67
Proton pump inhibitors	11	60	3	0	7	50
Flecainide	28	69	25	20	27	48
Beta-blocker	37	41	38	40	37	41
Calcium-channel blocker	17	38	23	33	20	35
Sotalol	22	40	20	25	21	33
ACE inhibitors	11	40	8	0	9	25
Propafenone	13	33	8	0	10	22
Digoxin	13	17	13	0	13	9

Amiodarone, although only tried by 4 afibbers, had a 100% success rate, but was accompanied by a 50% rate of adverse effects involving thyroid problems. Tranquilizers (Ativan, Xanax, Valium) were found quite effective for mixed afibbers and proton pump inhibitors (PPI) were effective for those with GERD or digestive problems. Flecainide had been tried by 27% of the total group of 86 respondents and had been found effective by 48%. Beta-blockers had been tried by 37% and found effective by 41%; however, 84% of those who had found beta-blockers successful were taking antiarrhythmics as well. Sotalol had been tried by 21% and found effective by 33%. There was no indication that sotalol was any less effective for vagal afibbers than for mixed.

Use of Alternative Protocols

Seventy-five percent of Group B and 54% of Group A had tried to reduce their afib burden with the use of stress management techniques and other alternative therapies. The percentage of those having tried the various protocols and their success rates are presented in Table 30.

Table 30
Alternative Protocols

	Group A		Group B		Total	
Alternative Therapy	Tried, %	Benefit, %	Tried, %	Benefit, %	Tried, %	Benefit, %
Breathing exercises	26	58	28	18	27	39
Relaxation therapy	17	38	33	31	24	33
Meditation	20	44	25	30	22	37
Yoga	9	75	10	25	9	50
Acupuncture	7	0	13	0	9	0
Amalgam removal/detox	7	67	3	0	5	50
Cognitive thinking	2	0	8	0	5	0
Qi Gong	2	100	3	100	2	100
Chiropractic	2	0	3	0	2	0
Tai Chi	2	0	3	0	2	0

Breathing exercise was the most popular protocol; it had been tried by 27% of the total group and found beneficial by 39%. Relaxation therapy had been tried by 24% and found beneficial by 33%, while meditation had been tried by 22% and found beneficial by 37%. Yoga had been found beneficial by half of the 9% of the group who had tried it. Two afibbers had tried Qi Gong and both had found it beneficial.

Treatment of Underlying Disease

A total of 18 Group A members (39%) and 14 Group B members (35%) had attempted to reduce or eliminate their afib burden by dealing with underlying disease conditions. Table 31 shows the most prevalent conditions dealt with and the degree of success in eliminating afib by doing so.

Table 31
Elimination of Diseases

	Group A		Group B		Total	
Disease	Tried, %	Benefit, %	Tried, %	Benefit, %	Tried, %	Benefit, %
Sleep apnea	9	75	5	0	7	50
GERD	20	33	15	17	17	27
Digestive problems	11	60	18	0	14	25
Food allergies	9	50	10	0	9	25
Hypoglycemia	9	25	3	0	6	20
Hypothyroidism	4	0	3	0	3	0

Treatment of sleep apnea (with a CPAP machine) was the most effective of the disease elimination protocols with an overall success rate of 50% (75% in Group A). The most common disease condition was GERD (gastroesophageal reflux disease), which 17% of the 32 afibbers had attempted to eliminate with a 27% success rate as far as reduction or elimination of afib is concerned. Fourteen percent had tried to eliminate digestive problems and 25% (60% in Group A) had been able to eliminate or reduce (by 50% or more) their afib by doing so.

Preventing Ectopics

Thirty percent of Group A did not experience ectopics, while only 17% of Group B were free of this annoyance. One third of Group A had found an effective means of dealing with ectopics, while only 15% of Group B had

done so. The most effective way of preventing ectopics was through supplementation with potassium (including low-sodium V8 juice) which 60% of Group A had found beneficial. Forty percent had found magnesium supplementation beneficial either on its own or in combination with potassium, and 20% (all vagal) had found the use of tranquilizers to be beneficial for ectopics.

Trigger Avoidance

Forty-five percent of Group A no longer had to avoid triggers, while 28% still had to do so, but to a lesser extent.

Review of Successful Protocols

The main modalities used by Group A were almost evenly split between the use of pharmaceutical drugs and the use of other approaches. Ultimately, 22 Group A respondents (no afib episodes in the last 6 months) had managed to achieve their afib-free status through the use of antiarrhythmic drugs (mostly flecainide). Fourteen had relied solely on drugs, while 4 had combined drugs, supplements (mostly magnesium), and alternative protocols. Four had combined antiarrhythmics with trigger avoidance, dietary changes, and elimination of GERD.

The remaining 24 respondents had managed to remain afib-free for at least 6 months through the use of protocols not involving pharmaceutical drugs. Trigger avoidance had been successfully practiced by 14 Group A members, but was usually accompanied by other protocols such as supplementation (10 respondents), dietary changes (4 respondents), and stress management and other alternative therapies (6 respondents). Diet changes had been made by 9 respondents, 8 of whom had also used supplementation (mostly magnesium) and 3 had also used other alternative methods. One respondent had managed to become afib-free through dietary changes alone. Seventeen (71%) of the 24 respondents had used supplementation with 3 relying on supplementation alone. It is interesting that no mixed afibbers had been successful in using dietary changes to eliminate their afib burden. The most successful – based on this albeit very small sample – were female, vagal afibbers who switched to a paleo diet.

CONCLUSIONS

A total of 248 afibbers (189 males and 59 females) participated in LAF Survey 14. The majority (89%) had paroxysmal afib with 50% having the vagal type and 33% the mixed. Mixed afibbers experienced significantly more episodes than did vagal ones, but adrenergic afibbers carried the highest overall afib burden (# of episodes x average duration) prior to the implementation of their programs.

A total of 224 respondents had attempted to reduce or eliminate their afib using means other than ablation or surgical procedures and had been on their program for 6 months or longer (36 months on average).

In answer to the question, "**Did you ultimately find a program that was successful in materially reducing or eliminating your afib burden?**", 144 respondents (64%) answered "YES" and 80 (36%) answered "NO". A total of 29 NO responders went on to have an ablation/maze procedure, of which, 19 (66%) were deemed to be successful. Five of the NO responders stated that their intervention program had been partially successful, but they decided to undergo an ablation or maze procedure anyway. Overall, 45 of the 248 respondents (18%) had undergone an ablation/maze procedure with 25 or 56% being successful.

There were no significant differences in baseline characteristics between YES and NO responders. The division into the two groups is clearly subjective since it is based on the respondents' feeling about the benefits of their chosen protocols. Nevertheless, some interesting differences stand out.

- The difference in percentage of mixed and vagal afibbers (27% vs 45% and 56% vs 38%) between the YES and NO responders was statistically significant ($p = 0.03$). This difference would indicate that vagal afib is comparatively easier to manage than is mixed afib.

- There was no significant difference in afib burden prior to program implementation when comparing YES responders to NO responders indicating that initial afib burden, as such, is not a determinant of ultimate success in reducing or eliminating afib.

- The most popular intervention program was trigger avoidance engaged in by 88% of all respondents. This was followed by supplementation (84%), therapy with pharmaceutical drugs (79%), dietary changes (55%), and other therapies (55%).

- Avoidance of caffeine had been found useful by 67% of respondents, alcohol avoidance by 56%, and avoidance of aspartame and MSG by 38% and 34% respectively. Altogether, respondents had identified 17 important triggers.

- The most important dietary changes were elimination of wheat, gluten and dairy products, and a switch to the Paleo diet. These changes were significantly more successful among females and vagal afibbers.

- Eighty-five percent of responders had tried supplementation. The most effective supplement was magnesium glycinate, which had been found beneficial by 48% of those who had tried it. Potassium supplementation (including low-sodium V8 juice) had been tried by 79% of all respondents and found beneficial by 43%. Taurine had been tried by 43% and found beneficial by 32%. About half of those supplementing with magnesium also took potassium and taurine.

- The most successful pharmaceutical drug was amiodarone, which had been tried by 10% and found beneficial by 65%. Flecainide (Tambocor) was the most popular antiarrhythmic. It had been tried by 38% of all respondents and been found successful by 60%.

- Breathing exercises and relaxation therapy were the most commonly tried stress reduction measures and had been found successful by 39% and 34% respectively. Yoga had been tried by 19% and found beneficial by 52%.

- Dealing with GERD, digestive problems, and food allergies had benefited 26-30% for those who dealt with these conditions. This clearly indicates that digestive problems are an important component of afib.

- The percentages of YES responders who believed that the various therapies had been beneficial on their own, or in combination with other measures, are given below:

	Sole Therapy	Combined
Trigger avoidance	36%	50%
Dietary changes	30%	55%
Supplementation	25%	53%
Drug therapy	56%	25%
Other therapies	19%	53%
Disease treatment	35%	44%

- About 50% of respondents had found a way of shortening their episodes. On-demand (pill-in-pocket) flecainide had been found effective by 25%, light exercise by 24%, and resting by 21%. The most effective therapies for women were hydrotherapy, meditation, tranquilizers and resting, while the most effective therapy for men was vigorous exercise. This is not surprising since

vigorous exercise will increase adrenergic tone and 80% of respondents who had found vigorous exercise beneficial were male, vagal afibbers.

- A third of respondents had found ways of preventing ectopics with supplementation with the magnesium/potassium/taurine combination being the most popular followed by the consumption of low-sodium V8 juice.

- A comparison between 46 afibbers (Group A) who had managed to completely eliminate their afib episodes over the most recent 6 months and 40 afibbers (Group B) whose condition had worsened or remained constant revealed the following:

    - The median birth weight in Group A was substantially lower than in Group B.
    - There was no indication that members of Group B had tried fewer interventions than had those members in Group A.
    - Group B had achieved no improvement at all through dietary changes, while Group A had achieved significant benefits, especially by changing to the Paleo diet (75%), avoiding dairy (60%), and eliminating wheat and gluten (33%).
    - Group A had achieved very significant benefits from supplementing with magnesium, potassium and taurine, while Group B had seen little or no benefit from supplementing.
    - Amiodarone was the most effective antiarrhythmic, but its use, in 50% of cases, was accompanied by adverse effects, notably thyroid problems. Tranquilizers (Ativan, Xanax, Valium) were found to be quite effective for mixed afibbers. Flecainide had been found effective by 41% of those who had tried it.
    - The treatment of sleep apnea and GERD had benefited 50% and 27% respectively.

Overall, it would appear that Groups A and B and indeed, YES and NO responders, are markedly different in that practically nothing worked for NO responders and those in Group B, while several different protocols worked quite well for YES responders and those in Group A.

It is not apparent what the difference is since there is no indication that NO responders were less diligent in their approach than were YES responders. It is possible that the statistically significant lower birth weight in Group A could contain a clue, but it is certainly not obvious what that clue might be, especially since a higher birth weight is generally associated with better cardiovascular health.

I have discussed the birth weight finding with Pat Chambers, MD and he points out that a higher birth weight such as found in Group B is associated with increased baroreflex sensitivity[1] and that an increased baroreflex sensitivity, in turn, is associated with more difficulty in dealing with sudden changes in autonomic tone that could lead to an afib episode. Thus, it may well be that lone afibbers can be divided into two groups - those (like in Group A) whose main underlying problems are magnesium deficiency, wheat sensitivity, etc. and those (like in Group B) whose main underlying problem is an increased baroreflex sensitivity. Clearly, it would be much easier to correct a magnesium deficiency than an increased baroreflex sensitivity, perhaps explaining why "nothing worked" for Group B. It is also intriguing to speculate that the reason why mixed type afibbers (neither pure adrenergic nor pure vagal) have a more difficult time reducing their afib burden could be that they have increased baroreflex sensitivity. Hopefully, medical researchers will some day cast more light over this finding.

[1] Leotta, G, et al. Effects of birth weight on spontaneous baroreflex sensitivity in adult life. *Nutrition, Metabolism and Cardiovascular Diseases*, Vol. 17, May 2007, pp. 303-10

Appendix A

Protocol for Afib Reduction/Elimination

The following 12-step program is based on the findings of LAF Survey 14, numerous Bulletin Board postings, especially from "The List", and with supporting information from my first book *Lone Atrial Fibrillation: Towards a Cure – Volume 1*.

1. Ensure that your condition is indeed lone atrial fibrillation (no underlying heart disease) and rule out known causes such as thyroid disorders, hypoglycemia, hyperaldosteronism (Conn's Syndrome) and pheochromocytoma.

2. Ensure that your liver and kidney functions are normal before embarking on an abatement program based on pharmaceutical drugs or supplements. This would involve BUN, creatinine and liver enzyme tests. It is also a good idea to establish your baseline electrolyte concentrations. This can be done through a simple blood test. Although the results are not very indicative of the concentration where it matters, namely in the myocytes (heart muscle cells) they will alert you to serious deficiencies. If the potassium level is below 4.5 mEq/L then supplementation is likely necessary to bring the daily intake up to the recommended 4500 mg/day. Magnesium level is best determined in red blood cells (RBCs) or in scrapings from the mouth (Exatest). NOTE: Probably close to 90% of lone afibbers test low for magnesium when using the Exatest. Finally, it would also be advisable to determine if systemic inflammation is present. A high-sensitivity C-reactive protein (hs-CRP) level above 1.0 mg/L (0.1 mg/dL) may indicate the need for supplementation with an effective anti-inflammatory such as beta-sitosterol or Zyflamend.

3. If not already doing so start keeping a detailed journal of the timing, duration and likely triggers of your afib episodes. This is essential in helping you determine the nature of your afib (adrenergic, mixed or vagal) and in establishing a successful abatement program.

4. Determine what your triggers are and scrupulously avoid them. If you are not yet sure what they are try avoiding caffeine, alcohol, MSG, aspartame, wheat, tyramine-containing foods, sugar and sleeping on your left side and see if that improves your situation.

5. Unless your magnesium and potassium levels are excessive begin supplementing with the magnesium, potassium, taurine combo to see if that is beneficial in your specific case. If your sun exposure is limited supplement with vitamin D as well to ensure optimum absorption of magnesium.

6. Eliminate wheat and gluten-containing grains from your diet. Rice is OK and oats and rye may be as well, but this needs to be determined on an individual basis. Also avoid high glycemic load foods, *trans*-fatty acids and tyramine-containing foods. Avoid large meals and if hypoglycemia is a problem have a light snack mid-morning and mid-afternoon. Ensure adequate hydration; daily water intake, in addition to that supplied by food, should be 1-1.5 liters (32-48 oz.)

7. Determine if you have any disease conditions associated with atrial fibrillation such as sleep apnea, GERD (gastroesophageal reflux disease), hyperthyroidism or hypoglycemia and take appropriate steps to deal with them. Also ensure that your digestive process is functioning properly. Bloating and gas formation in the stomach often cause ectopics and in some cases, atrial fibrillation. If this is a problem supplementation with pancreatic enzymes and betaine hydrochloride may be helpful. If bloating and gas occur close to bedtime an 80 mg simethicone tablet may help (best taken about 45 minutes prior to bedtime).

8. Find a relaxation therapy or other alternative protocol helpful in relieving stress that works for you and practice it daily.

9. If following steps 1-8 does not provide relief switch to a strict paleo diet. This combined with magnesium/potassium/taurine supplementation is probably the most effective step you can take, but it does require a very significant commitment, persistence, self-discipline and full cooperation from your spouse or significant other.

10. Try the on-demand (pill-in-pocket) approach to terminating episodes quickly with flecainide crushed and swallowed with lukewarm water at the start of an episode (200 mg for people weighing less than 70 kg (154 lbs) and 300 mg for people weighing more than 70 kg). In the case of a heart rate exceeding 100 bpm taking a beta-blocker first may be advisable. Propafenone (Rythmol) can also be used for the on-demand approach (450 mg for people weighing less than 70 kg and 600 mg for people weighing over 70 kg).

11. Consider going on an antiarrhythmic drug full time. Flecainide (Tambocor), possibly in combination with a beta-blocker, would appear to be most successful and should generally be tried first (50-100 mg every 12 hours). Only as a last resort should amiodarone or amiodarone+flecainide be tried.

12. If steps 1-11 have been faithfully followed and doing so has brought no relief get in line for an ablation or maze procedure with a highly skilled and experienced electrophysiologist or cardiac surgeon.

Why not go directly to an antiarrhythmic or ablation you may ask!? Because, there is no guarantee of success and both have the potential for serious adverse effects, while improving your diet, eliminating wheat and supplementing with magnesium only have positive effects.

THE AFIB REPORT is published 10 times a year by:
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