SILENT ATRIAL FIBRILLATION: TO TREAT OR NOT TO TREAT

After Catheter Ablation

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CONFLICTS OF INTEREST TO DISCLOSE:

Consultant: Biosense Webster, Daiichi Sankyo

Research Grant:
- Bayer Pharma: X-VERT Trial (Local PI)
- Biosense Webster: OAT Study (Steering Committee)
- BMS/Pfizer: AEGEAN Trial (Local PI)
- Daiichi Sankyo: ENSURE AF Trial (National PI, Steering Committee)
- Boheringher Ingelheim: RE-CIRCUIT Trial (National PI)
- AF-NET, BMS/Pfizer: AXAFA Trial (National PI)

Speaker Honoraria: Bayer Pharma, Boheringher Ingelheim, Daiichi Sankyo
Efficacy of RF catheter ablation: included studies with more than 40 pts

Very Long-Term Efficacy of AF Ablation

year 2.5. Bertaglia et al. published that the actuarial arrhythmia recurrence rate was 13.0% at 2 years, 21.8% years, 35.0% at 4 years, 46.8% at 5 years, and 54.6% at 10 years. However, in both of these studies, the initial success rates were substantially lower than those reported in the present section. Perhaps a difference in ablation technique resulting in a higher late recurrence rate. Furthermore, although recurrences may be common, performing an additional procedure may still provide very long-term success, as described by Sawhney et al. 170

acy in Nonparoxysmal AF

general, the success rate of AF ablation is lower in patients with persistent or long-lasting persistent AF compared with paroxysmal AF. Many studies show success rates of and to 54% may succeed 48% alone high and Mec

S recu
True very late recurrences

or

Recurrences underestimated during the follow up
Asymptomatic AF

Intensity of follow-up strategy & AF detection rate:

Kircher S et al. *Cur Cardiol Rev* 2012; 8: 354-61
Asymptomatic AF

Detection Methods:

- Standard-12 lead ECG
- 24-h / 7-d Holter monitoring
- In-hospital telemetry
- Mobile continuous outpatient telemetry
- Event recorder / Intermittent TTEM
- PM - ICD Device memory
- External & Implantable loop recorder
Relative AF duration in % of total recording during 7-day ECG

Figure 3. Relative duration of atrial fibrillation (AF) in % during 7-day electrocardiogram (ECG) recording before and after ablation, and 3, 6, and 12 months after placement of linear left atrial lesions.

DISCUSSION

Main findings. In the present study, results of ablation of AF are described for the first time with mean follow-up of 12 ± 5 months. No thromboembolic complications or events were observed in the entire study population.
AF freedom with comparison of 24-h Holter versus 7-day ECG & percentage of pts on AAD

Time course of relative distribution of length of individual AF episodes in pts with recurrent AF

AF episodes >24 h: 1/33 (3%) of patients

Closed bars >24 h; hatched bars: >2 to 24 h; open bars: 30 s to 2 h

Symptomatic and asymptomatic AF duration during the 7-day Holter monitoring

<table>
<thead>
<tr>
<th></th>
<th>Before ablation</th>
<th>After ablation</th>
<th></th>
<th>Asymptomatic Patients Only</th>
<th>Symptomatic Patients Only</th>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Patients With SR, n</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>114</td>
<td>22 (19%)</td>
<td>92</td>
<td>5 (5%)</td>
<td>35 (38%)</td>
<td></td>
</tr>
<tr>
<td>Before ablation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediately</td>
<td>114</td>
<td>36 (32%)</td>
<td>78</td>
<td>17 (22%)</td>
<td>16 (21%)</td>
<td>45 (4)</td>
</tr>
<tr>
<td>3 Months</td>
<td>114</td>
<td>65 (57%)</td>
<td>49</td>
<td>18 (36%)</td>
<td>8 (16%)</td>
<td>23 (4)</td>
</tr>
<tr>
<td>6 Months</td>
<td>108</td>
<td>54 (50%)</td>
<td>54</td>
<td>20 (37%)</td>
<td>14 (26%)</td>
<td>20 (4)</td>
</tr>
<tr>
<td>12 Months</td>
<td>70</td>
<td>45 (64%)</td>
<td>25</td>
<td>9 (36%)</td>
<td>5 (20%)</td>
<td></td>
</tr>
</tbody>
</table>

Symptomatic and asymptomatic AF duration during the 7-day Holter monitoring

Symptomatic and asymptomatic AF duration during the 7-day Holter monitoring

Use of beta-blockers and antiarrhythmic drugs during SR:

<table>
<thead>
<tr>
<th>Drug Category</th>
<th>Efficacy Rate</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Ic antiarrhythmics</td>
<td>51%</td>
<td>58% (0.16)</td>
<td>51%</td>
</tr>
<tr>
<td>Class III antiarrhythmics</td>
<td>41%</td>
<td>23% (0.002)</td>
<td>30%</td>
</tr>
<tr>
<td>AF-HR (25th, 75th percentile)</td>
<td>110 (95, 120)</td>
<td>100 (90, 120)</td>
<td>100 (91, 120)</td>
</tr>
<tr>
<td>SR-HR (25th, 75th percentile)</td>
<td>66 (60, 75)</td>
<td>66 (60, 72)</td>
<td>65 (60, 72)</td>
</tr>
</tbody>
</table>

HR indicates heart rate.

Ablation strategy: No PVI

Left atrial diameter, mm
LV ejection fraction, %
No previous ablation attempt, n (%)
Previous AF ablation or operation, n (%)
Previous atrial flutter ablation, n (%)
Previous other arrhythmia ablation, n (%)

AF = atrial fibrillation; CM = cardiomyopathy; LV = left ventricle

Continued for at least three months. Especially in patients with persistent AF and in patients with paroxysmal AF and underlying structural heart disease, further continuation of oral anticoagulation was advised.

Statistics. Results are expressed as mean values ± 1 SD, or numbers and percentages, as appropriate. Continuous variables as number of AF episodes and duration per AF episode were compared by a one-way analysis of variance (ANOVA), post-hoc analysis with Bonferroni correction for multiple comparisons for parametric data, and Mann-
Influence of the duration of Holter monitoring on the detection of arrhythmia recurrences after AF catheter ablation

Implications for patient follow-up

Recurrences during 7-day Holter recordings: 30%

Durations up to 5 days would have detected significantly more patients with recurrence compared with the complete 7-day period: a 24-hour Holter would have detected 59%, a 48-hour Holter 67% and a 72-hour Holter 80% of patients with recurrence. In contrast, a 4-day Holter would have detected 91% of all recurrences and even a 72-hour monitoring would miss 20% of the recurrences that would be detected with a 7-day recording. Instead, a 4-day recording might offer a reasonable compromise between the recurrences that would be detected with a 7-day recording.

The Figure shows these data as percentages among the 64 patients who had a recording up to the total duration of 7 days. The Figure depicts the percentages of patients with recurrence that were detected with Holter recordings of durations of 1 day, 2 days, 3 days, etc., i.e. the percentages of patients who had an arrhythmia recurrence within the first 24, 48, 72 h, etc. of the Holter recording with the McNemar test with SigmaStat 3.11. The numbers of patients who had a recurrence during the complete 7-day recording at 6 months, 64% of all patients (30%) showed an arrhythmia recurrence (AF, atrial flutter or atrial tachycardia lasting longer than 30 s) was reported as arrhythmia recurrence. The numbers of patients that were detected the great majority (91%) of recurrences that were detected with the complete 7-day recording. Data are shown as percentages among the 64 patients who had a recurrence during the first 24, 48, 72 h, etc. of the Holter monitoring on the day of the procedure, was 32±40% (median 12%). Circumstances detecting a continuous ECG recording may miss AF episodes, since AF often occurs sporadically and unpredictably. We also did not address the question how often and when Holter recordings should be repeated. Future studies utilizing implantable loop detectors could provide answers to these questions.
Transtelephonic ECG is better than standard ECG and 24-h Holter recordings in evaluating AF relapses after RCA, thus decreasing the short-term success of ablation from 86% to 72%.
Recurrence of AF & Mode Switching Events

Verma A et al. JCE 2007; 18: 601-6

19/21 (90%) pts <60 s
19/21 (90%) pts the episodes fell in the blanking period (3 months post ablation)

18 were when the pts were still taking AAD

Only 2 (3%) pts continued to have asymptomatic MSE after 3 months post-ablation

What is the real AF burden after catheter ablation of atrial fibrillation? A prospective rhythm analysis in pacemaker patients with continuous atrial monitoring

burden has been shown (5.5 × 10 –
What is the real AF burden after catheter ablation of atrial fibrillation? A prospective rhythm analysis in pacemaker patients with continuous atrial monitoring

In patients with AF recurrences a significant decrease in AF burden was achieved.
What is the real AF burden after catheter ablation of atrial fibrillation? A prospective rhythm analysis in pacemaker patients with continuous atrial monitoring

Pulmonary vein (PV) isolation has emerged as an effective therapy for paroxysmal atrial fibrillation (PAF) with success rates ranging between 60 and 80%. In patients with persistent AF (PersAF), there is growing evidence that additional substrate modification is necessary to achieve similar results as in PAF patients. The electrophysiological endpoints are electrical arrhythmia termination in patients with persistent or inducible AF after PVI as well as in patients with a history of long-lasting persistent AF (PersAF, ≥1 year).

**Keywords**
- Atrial fibrillation
- Ablation
- Pacemaker
- Atrial Holter recording

**Introduction**

Pulmonary vein (PV) isolation has emerged as an effective therapy for paroxysmal atrial fibrillation (PAF) with success rates ranging between 60 and 80%. In patients with persistent AF (PersAF), there is growing evidence that additional substrate modification is necessary to achieve similar results as in PAF patients. The electrophysiological endpoints are electrical arrhythmia termination in patients with persistent or inducible AF after PVI as well as in patients with a history of long-lasting persistent AF (PersAF, ≥1 year).

**Methods**

The study comprised 37 patients (64.6±13.5 years, 12 female) with predominantly atrial fibrillation (AF) of patients even with PersAF. Continuous atrial monitoring reveals AF ablation success rates comparable with those assessed by clinical evaluation. Symptomatic freedom of AF correlated well with the actual freedom of patients’ symptoms. Complete AF freedom was observed in 85% (17 patients) of PAF patients and 59% (10 patients) in patients with PersAF.

**Aim**

In this highly symptomatic patient cohort, continuous atrial monitoring reveals AF ablation success rates comparable with those assessed by clinical evaluation. Symptomatic freedom of AF correlated well with the actual freedom of patients’ symptoms.

**Results**

The mean atrial Holter monitoring period was 7.4±3 months before and 3.3 months after ablation with an overall AF burden of 33.7% prior to ablation. During follow-up, AF burden decreased from 17.3–0.65% (P<0.001) in PAF patients and from 57.4 to 13.9% (P<0.024) in patients with PersAF.

**Conclusion**

In the present study we could show, that freedom from AF can be achieved by catheter ablation in a high percentage of patients even with PersAF. Continuous atrial monitoring reveals AF ablation success rates comparable with those assessed by clinical evaluation. Symptomatic freedom of AF correlated well with the actual freedom of patients’ symptoms.

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Paroxysmal AF burden before and after PV Isolation: an observational study through ILR

Time to 1st recurrence of AF/AT after the 3-m blanking period:

Figure 3. Evolution over time of monthly AFB for each patient since before ablation (dotted line) until 12 months after. The full line shows the end of the blanking period. Please note that there are patients with cumulative AFBpre below 0.5% before ablation. Group I has no AF episodes after the blanking period. In group II, there is a 90% reduction in each patient of the cumulative AFB (AFBpre > AFBpost) since the blanking period until the end of follow-up; some patients have AFB over 0.5% in 1 month. In group III, there is no variation in the cumulative AFBpre and AFBpost. In group IV, there is a 90% increase of the cumulative AFB (AFBpre < AFBpost) after the blanking period. All patients with ERATs have LRAT. The asterisk marks the moment of repeat procedure. Abbreviations are the same used in the main text.

Figure 4. Kaplan–Meier curve: time to first recurrence of AF/AT in days after the 3-month blanking period (day 0). (A) First procedure; (B) Second procedure.

rate of success with more than 1 procedure, at the end of a 12-month follow-up. The difference with our results in terms of the final rate of success may be due to the definition of success. They consider AFB values below <0.5% per month after the blanking period as a “responder” to ablation. Even though this value is useful to define a patient at low risk of embolism, it must not be considered as a “surrogate” for ablation “success.” Thus, in our study, monthly AFB <0.5% was already present in some patients before the procedure, and in those patients with a 90% reduction in cumulative AFB there was some assessment of monthly AFB >0.5%.

Group III with lack of efficacy had an especially low AFBpre, 1° procedure


2° procedure
Paroxysmal AF burden before and after PV Isolation: an observational study through ILR

Patients with symptomatic and asymptomatic episodes pre and post ablation:

are not secondary to inflammatory or other associated with the ablation, but that, probably by an incomplete PV isolation. Only 2 patients had a first recurrence episode outside the interval of time that we consider the blanking period. It is important to note that no patient had only both patients had very low cumulative AFB. It justify that the failure of PV isolation had at an earlier stage.

It is well known that patients with AF have asymptomatic episodes.15,26 This also happens in patients with per- episodes.15,26 This also happens in patie ablative ablation.13,20,23,24,27,28 In our study the nu

DISCERN AF study
Asymptomatic AF/AFL/AT before and after ablation

Prospective, multicenter study using ICM:

AF recurrences after RCA: 12% totally asymptomatic

To our knowledge, this study is the first prospective multicenter study to examine the incidence and predictors of asymptomatic AF after ablation using continuous monitoring. Although ablation significantly reduces the burden of AF, the proportion of asymptomatic AF episodes increases. Asymptomatic episodes were more likely to be AFL/AT, were slower and shorter, and had lower HRV. The use of antiarrhythmics and the rate of recurrence...
Discerning the incidence of symptomatic and asymptomatic AF Episodes before & after catheter ablation (DISCERN AF)

Prospective, multicenter study using ICM:

Postablation episodes were significantly less frequent, with a median of 6 (interquartile range 10-202) minutes (P < .001). Heart rate decreased after ablation from 142 (6) to 94 (6) beats per minute (P = .002). Changes in arrhythmia characteristics are depicted in Figure 2.

Ablation success rate by Holter/ECG, and the mean number of procedures were not statistically different.


Abbreviations: AF/AFL/AT, atrial fibrillation/atrial arrhythmia; ECG, electrocardiography; ICM, implantable cardioverter-defibrillator.
Figure 1. Mean atrial fibrillation relative burden during the first 12 months of follow-up. Reported by the patients displayed a sensitivity of 53% and a PPV of 89% in identifying AF recurrences during the overall follow-up period.

Changes in clinical symptoms after ablation, in comparison with the baseline, are detailed in Figure 3. In particular, a statistically significant reduction in symptoms (from 82% to 44%; \( P < 0.0001 \)) was observed at the last follow-up visit.

Symptoms were not associated to a higher ventricular rate during AF episodes: mean ventricular rate was 95 bpm (25–75th percentiles: 91–98) on the days with symptoms, versus 97 bpm (25–75th percentiles: 93–101) on the days without symptoms (\( P = 0.059 \)). Regarding the changes in quality of life ascertained by the SF-12 questionnaire, a significant improvement in mental and physical functioning and overall health-related quality of life from the baseline to the last follow-up visit was documented by the PCS (44.5 ± 8.5 vs 51.0 ± 6.7, \( P < 0.0001 \)) and MCS (45.7 ± 9.3 vs 49.2 ± 6.1, \( P = 0.008 \)).

Drug Therapy

At the baseline, 89% of patients were on anticoagulation treatment, while at the 12-month follow-up visit, 77% were anticoagulated. Antiplatelet drug administration increased from 14% at the baseline to 39% at the 12-month follow-up visit, while the use of antiarrhythmic drugs remained the same (79% vs 80%, \( P = 0.901 \)). Finally, more patients were on beta-blockers or Ca\(^{2+}\)-antagonists at the last follow-up visit than at the baseline. There were no differences in antiarrhythmic drug therapy use between symptomatic and asymptomatic patients (6 months postablation: 80% vs 76%, \( P = 0.581 \); 12 months postablation: 82% vs 75%, \( P = 0.331 \)) or between those with and without AF recurrences.

Figure 2. Relative burden of atrial fibrillation distribution during the follow-up by episode length.

Only asymptomatic AF after 3-m follow up: 15%
Figure 1. Mean atrial fibrillation relative burden during the first 12 months of follow-up. Reported by the patients displayed a sensitivity of 53% and a PPV of 89% in identifying AF recurrences during the overall follow-up period.

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**Figure 2.** Relative burden of atrial fibrillation distribution during the follow-up by episode length.
Rhythm-Symptom Correlation in Patients on Continuous Monitoring After Catheter Ablation of Atrial Fibrillation

Symptom-Rhythm correlation based on pts symptoms report:

Figure 3. Specification of symptoms before ablation and at the last follow-up visit.

Discussion

Main Results

This is the first multicenter analysis to assess the impact of an implantable cardiac monitor in evaluating the long-term follow-up of a cohort of patients who have undergone catheter ablation for paroxysmal or persistent AF. Our results are consistent with recent studies,\textsuperscript{13,14} documenting a very high rate of asymptomatic arrhythmia recurrences: nearly half of the

\[5/143: 3.5\%\]
Assessing Arrhythmia Burden After Catheter Ablation of Atrial Fibrillation Using an Implantable Loop Recorder: The ABACUS Study

Single-center, prospective, randomized study:

Conventional Monitoring: Twice daily 1-min pulse rate assessments by the patient and three 30-day TTM periods (at discharge, 5 and 11 m following ablation)

![Image](https://example.com/image.png)

Kapa S et al. J Cardiovasc Electrophysiol 2013; 24: 875-81
Over the first 6 months, ILR categorized 915 episodes AF, of which 420 were adjudicated to be true AF (accuracy = 46.0%). The causes of ILR misclassification of AF included frequent premature atrial and ventricular contractions (36% of misclassified episodes) and over or undersensing R waves (34% of misclassified episodes). Eighty-two of 495 (17%) misclassified episodes occurred in one patient, and 447 of 495 (90%) misclassified episodes occurred in 14 patients. Importantly, most patients (n = 13, 68%) with misclassified...
Atrial Arrhythmia Burden on Long-Term Monitoring in Asymptomatic Pts Late After AF Ablation

Asymtomatic atrial tachyarrhythmias >30 sec by pt at LTM done at 3.1± 1.3 yrs: 5%

Table 1 presents patients’ clinical characteristics before ablation. There were 151 (74.4%); average age was 63.1 ± 9.9 years. AF was standing persistent in 21 patients. Beta blockers for rhythmic reasons were taken by 36 (18%). LTM was an average of 3.1 ± 1.3 years (range, 1.1 to 7.3) after last ablation.

For the 7-day monitors, average duration of monitoring per patient was 134 ± 30 hours with 132 ± 30 analysis hours. Of 186 patients undergoing 7-day monitoring, (95.3%) did not have a single episode of an atrial tachyarrhythmia >30 seconds. Eight (4.3%) had atrial arrhythmia occurrences lasting >30 seconds. Table 2 presents arrhythmia burden in these 8 patients. One patient w
## Incidence of Asymptomatic AF

<table>
<thead>
<tr>
<th>Category</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovered incidentally / ECG*</td>
<td>16 - 25</td>
</tr>
<tr>
<td>During AAD Therapy / TTEM^</td>
<td>56 - 70</td>
</tr>
<tr>
<td>PM – ICD recipients / Device memory°</td>
<td>51 - 74</td>
</tr>
<tr>
<td>Post-AF Ablation / TTEM, 7-d Holter,”…”</td>
<td>0 - 20</td>
</tr>
</tbody>
</table>


Presence and duration of AF detected by continuous monitoring: crucial implications for the risk of TE

Capucci et al. JACC 2005;46:1913–20

Botto et al. JCE 2009; 20: 241-8
The relationship between daily atrial tachyarrhythmias burden from implantable device diagnostics and stroke risk (The TRENDS study)

**TE rates for the overall study group (unadjusted):**

<table>
<thead>
<tr>
<th>AT/AF Burden Subset</th>
<th>Annualized TE Rate (95% CI), %</th>
<th>Annualized TE Rate Excluding TIA (95% CI), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero AT/AF burden</td>
<td>1.1 (0.8–1.6)</td>
<td>0.5 (0.3–0.9)</td>
</tr>
<tr>
<td>Low AT/AF burden (&lt;5.5 h)</td>
<td>1.1 (0.4–2.8)</td>
<td>1.1 (0.4–2.8)</td>
</tr>
<tr>
<td>High AT/AF burden (5.5 h)</td>
<td>2.4 (1.2–4.5)</td>
<td>1.8 (0.9–3.8)</td>
</tr>
</tbody>
</table>

AT/AF burden is the maximum duration of AT/AF on any given day in the preceding 30 days

Glotzer TV et al. Circ Arrhythm Electrophysiol 2009;2:474-80
Anticoagulation after AF ablation

OAT at 12 months after ablation in relation to the CHADS$_2$ score and the detection of recurrences during 6-month 7-day Holter:

In the univariate logistic regression, there was a significant association between the use of oral anticoagulation at the

Thromboembolic Risk Factors According to CHADS2 Score in the Off- and On-OAT Groups

<table>
<thead>
<tr>
<th>CHADS2 Score</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-OAT group, n</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congestive HF</td>
<td>0</td>
<td>40</td>
<td>20</td>
<td>26</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>154</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0</td>
<td>644</td>
<td>175</td>
<td>72</td>
<td>15</td>
<td>8</td>
<td>2</td>
<td>936</td>
</tr>
<tr>
<td>Age ≥ 75 yrs</td>
<td>0</td>
<td>22</td>
<td>43</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>0</td>
<td>17</td>
<td>36</td>
<td>32</td>
<td>11</td>
<td>4</td>
<td>2</td>
<td>143</td>
</tr>
<tr>
<td>Prior stroke/TIA</td>
<td>0</td>
<td>63</td>
<td>41</td>
<td>11</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>126</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,622</td>
<td>723</td>
<td>245</td>
<td>77</td>
<td>15</td>
<td>8</td>
<td>2</td>
<td>3,473</td>
</tr>
</tbody>
</table>

| **Off-OAT group, n** | | | | | | | | |
| Congestive HF | 0 | 37 | 51 | 15 | 6 | 3 | 0 | 112 |
| Hypertension | 0 | 211 | 153 | 39 | 9 | 4 | 0 | 376 |
| Age ≥ 75 yrs | 0 | 6 | 29 | 5 | 5 | 2 | 0 | 47 |
| Diabetes mellitus | 0 | 7 | 93 | 16 | 3 | 0 | 0 | 106 |
| Prior stroke/TIA | 0 | 58 | 26 | 7 | 4 | 0 | 0 | 106 |
| **Total** | 155 | 261 | 191 | 42 | 10 | 4 | 0 | 761 |

Themistoclakis et al. *J Am Coll Cardiol* 2010;55:735–43
## Incidence of Embolic and Hemorrhagic Events

*Mean follow up: 28±13 and 24±15 months*

<table>
<thead>
<tr>
<th></th>
<th>Off OAT group</th>
<th>On OAT group</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients, n (%)</td>
<td>2692</td>
<td>663</td>
<td></td>
</tr>
<tr>
<td>Tromboembolic events, n (%)</td>
<td>2 (0.07)</td>
<td>3 (0.45)</td>
<td>0.06</td>
</tr>
<tr>
<td>Hemorrhagic events, n (%)</td>
<td>1 (0.04)</td>
<td>13 (2.0)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Themistocakis et al. *J Am Coll Cardiol* 2010;55:735–43
Clinicians should be aware of the importance of long-term vigilance for AF recurrence, especially in patients with thromboembolic risk.
Patients should be seen in follow-up at a minimum of 3 months following the ablation procedure and then every 6 months for at least 2 years.

An event monitor should be obtained to screen for recurrent AF/flutter/tachycardia in patients who complain of palpitations during follow-up.

An AF/flutter/tachycardia episode is present if it is documented by ECG and last at least 30 sec.

Patients being evaluated as part of a clinical trial or in whom warfarin may be discontinued should have some type of continuous ECG monitoring performed to screen for asymptomatic AF/flutter/tachycardia.

24-hour Holter monitoring is an acceptable minimal monitoring strategy for patients enrolled in a clinical trial and is recommended at 3 to 6 months intervals for one to two years following ablation.

Calkins H et al. *Heart Rhythm* 2012; 4: 816-61
2012 focused update of the ESC Guidelines for the management of atrial fibrillation

Recommendation for screening of AF:

focus on the identification of ‘truly low-risk’ patients who need any antithrombotic therapy, and of novel oral anticoagulant drugs
ACC/AHA/HRS 2014 Guidelines

Class I
• AF catheter ablation is useful for **symptomatic paroxysmal** AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication when a rhythm control strategy is desired **(Level of Evidence: A)**
• Prior to consideration of AF catheter ablation, assessment of the procedural risks and outcomes relevant to the individual patient is recommended. **(Level of Evidence: C)**

Class IIa
• AF catheter ablation is reasonable for selected patients with **symptomatic persistent** AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication  **(Level of Evidence: A)**
• In patients with **recurrent symptomatic paroxysmal** AF, catheter ablation is a reasonable initial rhythm control strategy prior to therapeutic trials of antiarrhythmic drug therapy, after weighing risks and outcomes of drug and ablation therapy **(Level of Evidence: B)**

Class IIb
• AF catheter ablation may be considered for **symptomatic long-standing** (>12 months) persistent AF refractory or intolerant to at least 1 class I or III antiarrhythmic medication, when a rhythm control strategy is desired  **(Level of Evidence: B)**
• AF catheter ablation may be considered prior to initiation of antiarrhythmic drug therapy with a class I or III antiarrhythmic medication for **symptomatic** persistent AF, when a rhythm control strategy is desired. **(Level of Evidence: C)**

Class III: Harm
• AF catheter ablation should not be performed in patients who cannot be treated with anticoagulant therapy during and following the procedure. **(Level of Evidence: C)**
Catheter Ablation of Asymptomatic Longstanding Persistent AF

Exercise parameters:

Catheter Ablation of Asymptomatic Longstanding Persistent AF

Exercise parameters in successful vs failed procedures:

Catheter Ablation of Asymptomatic Longstanding Persistent AF

Baseline QoL score and the changes at 12-mo Follow-Up:

Arrhythmia perception

Of the 25 patients experiencing recurrence,1 presented with symptomatic recurrence. Among symptomatic patients, 81% experienced fatigue on exertion, 67% weakness, 67% shortness of breath and anxiety, 52% dizziness, and 43% reported exper pain.

AF Recurrence

After 20 ± 5 months follow-up, 36 (57%) remained recurrence-free off-AAD after a single ablation. Of the 25 patients experiencing recurrence, 7 (28%) had atrial flutter, and 1 (4%) patient...

After 20 ± 5 months follow-up, 36 (57%) patients mained recurrence-free off-AAD after a single proced Of the 25 patients experiencing recurrence, 7 (28%) had 17 (68%) had atrial flutter, and 1 (4%) patient had a tachycardia. As observed from Holter recording, the ra of ventricular rate for patients with recurrent AF, flutter,
An European Investigator-initiated, Prospective, Parallel-group, Randomized, Open, Blinded Outcome Assessment Multi-centre Trial

Conducted by AFNET and EHRA
EAST setting and National PIs

- Approximately 3000 patients
- Enrolment in 11 European Countries (200 centres)
- Follow-up of all patients until end of trial (event-driven design)
- Expected mean follow-up time 3-4 years

Belgium: Prof. Hein Heidbuchel, Leuven
Czech Republic: Prof. Josef Kautzner, Prague
Denmark: Prof. Axel Brandes, Odense
France: Prof. Etienne Aliot, Nancy
Germany: Prof. Stephan Willems, Hamburg
Great Britain: Prof. John Morgan, Southampton
Italy: Prof. Michele Gulizia, Catania, Prof. Sakis Themistoclakis, Venice
Netherlands: Prof. Isabelle van Gelder, Groningen
Poland: Prof. Lukasz Szumowski, Warsaw
Spain: Prof. Lluis Mont, Barcelona
Switzerland: Dr. Laurent Haegeli, Zurich
Adequate and early comprehensive rhythm control therapy can prevent AF-related major complications (stroke, death, heart failure) compared to usual care

**Primary outcome:**
Composite of cardiovascular death, stroke, and heart failure or acute coronary syndrome measured as hospitalization

**Enrolment:**
Patients with recent-onset AF at risk for stroke or death