Atrial Fibrillation: A Brief Guide to Patient Impact, Disease Management and Treatment Outcomes

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What is Atrial Fibrillation and why is it important?

Atrial Fibrillation (AFib) is characterized by an irregular and often fast heartbeat that results in uncoordinated contraction of the atria.\(^1\)

AFib is the most common type of cardiac arrhythmia, and affects over 5.5 million people in the U.S., and over 33 million people worldwide.\(^2\) In the U.S., AFib is the primary cause of over 750,000 hospitalizations and approximately 150,000 deaths each year.\(^4\)

AFib can be categorized into several types:\(^5,6\)
- First-diagnosed AFib: AFib that has not been diagnosed before, regardless of how long it has been present for.
- Paroxysmal AFib: Occasional AFib that stops ≤7 days.
- Persistent AFib: Continuous AFib that lasts longer than 7 days.
- Early Persistent AFib: Continuous AFib that lasts 7 days to 3 months.
- Long-standing Persistent AFib: Continuous AFib that lasts >12 months.
- Permanent AFib: Represents a therapeutic attitude, where the presence of AFib is accepted by the patient and physician, and no more attempts will be made to restore or maintain sinus rhythm.

Risk factors for AFib include:

**LIFESTYLE FACTORS\(^5-6\)**
- Obesity
- Smoking
- Alcohol consumption
- Caffeine consumption
- Stress

**OTHER CONDITIONS\(^7-11\)**
- High blood pressure
- Heart failure
- History of heart attack
- Coronary artery disease
- Other heart disease

**NON-MODIFIABLE FACTORS\(^5-11\)**
- Older age
- Family history or other genetic factors
- Male sex

Early detection and diagnosis of AFib may help improve patient outcomes, since a long history and duration of AFib have been associated with recurrence.\(^13\)

Symptoms of AFib disrupt daily life and range from mild to debilitating.\(^19-21\)

The most common symptoms are: \(^14, 22, 23\)
- **65%** PALPITATIONS
- **50%** FATIGUE
- **43%** SHORTNESS OF BREATH
- **30%** MALAISE
- **19%** DIZZINESS
- **12%** ANXIETY
- **12%** CHEST PAIN
- **5%** OTHER

Patients with AFib have an increased risk for life-threatening complications and other diseases: \(^4, 24\)

- **5x** Increase HEART FAILURE
- **5x** Increase STROKE
- **2x** Increase CARDIOVASCULAR MORTALITY

AFib worsens quality of life for patients and caregivers.\(^16, 23\)

AFib increasingly places a critical financial burden on the healthcare system, costing an estimated $37.2B in the United States in 2020.\(^2\)
Following the diagnosis of AFib, the 2014 AHA/ACC/HRS guidelines recommend an integrated and structured approach to patient care and AFib management that involves multidisciplinary healthcare teams and places patients in a central role in decision-making.26

**Oral Anticoagulation Therapy for Stroke Prevention in patients with AFib**

In patients with CHA2DS2-VASc score ≥2, oral anticoagulation is recommended.

**Rate Control Therapy to Lower and Control Heart Rate and Improve Symptoms of AFib**

In patients with LVEF <40% or signs of congestive HF, low dose β-blockers are recommended. In patients with LVEF ≥40%, β-blockers or non-dihydropyridine calcium channel antagonists are recommended. The recommended target heart rate to achieve is <110bpm.

**Pharmacological or electrical cardioversion is recommended when patients have:**
- No or minimal signs of heart disease
- Coronary artery disease or left ventricular hypertrophy
- Heart failure

**Electrical cardioversion is recommended when:**
- Hemodynamic instability is present

**AAD usage:** needs to consider the presence of comorbidities, cardiovascular risk, potential for proarrhythmia, toxic effects, symptom burden, and patient preference.2

**Catheter ablation recommended in:**
- Symptomatic paroxysmal AFib patients refractory/intolerant to ≥1 AADs (Class I or III)

**Catheter ablation may be considered in:**
- Persistent or long-standing persistent AFib
- Congestive HF
- Older patients (>75 years)
- Younger patients (<45 years)
- Hypertrophic cardiomyopathy
- Asymptomatic AFib

**Selection of 2nd Rhythm Control Therapy After Failure of 1st Rhythm Control Therapy.**

After failure of first-line medical therapy or catheter ablation, patients can work closely with multidisciplinary care teams to decide on the most appropriate treatment:
- Another AAD
- Catheter ablation (first or repeat)
- Hybrid therapy

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**Abbreviations:** AAD = antiarrhythmic drug; AFib = Atrial Fibrillation; AVR = aortic valve replacement; CABG = coronary artery bypass graft; CHA2DS2-VASc = Congestive Heart failure, hypertension, Age ≥75 (doubled), Diabetes, Stroke (doubled), Vascular disease, Age 65–74, and Sex (female); HF = heart failure; LVEF = left ventricular ejection fraction

**Current treatment options available for managing AFib**

The therapeutic goal of the initial management strategy for AFib is to treat any underlying cardiovascular conditions and reduce the risk of stroke.5

**RATE CONTROL THERAPIES**

**PHARMACOLOGICAL**
- Beta blockers or non-dihydropyridine calcium channel antagonists, digitalis glycosides, or amiodarone

**SURGICAL**
- AV node ablation with pacemaker implantation

**RHYTHM CONTROL THERAPIES**

**ELECTRICAL CARdioVERSION**

**PHARMACOLOGICAL CARdioVERSION**

**CATHETER ABLATION**

**HYBRID THERAPY**

When multidisciplinary AF treatment teams were utilized to select appropriate treatment for AF patients, significant reductions in health resource utilization, inpatient admission rate and length of stay were observed.27, 46, 47

Significant difference, p<0.001
What is the impact of antiarrhythmic drug therapy in managing AFib?

Antiarrhythmic drug therapy is an integral part of maintaining sinus rhythm after cardioversion; antiarrhythmic drugs act to suppress the firing of or depress the transmission of abnormal electrical signals.\(^5\)

**CLINICAL IMPACT**

Antiarrhythmic drug therapy is safe and moderately effective at maintaining normal sinus rhythm; its impact on AFib-related complications such as stroke, heart failure and mortality have been demonstrated in a limited number of studies.

AADs are moderately effective:

\[
\begin{array}{ccc}
33\% - 56\% & \text{success for maintaining normal sinus rhythm at 1 year.}^{28} \\
50\% & \text{of patients do not respond to or cannot tolerate medications.}^{28}
\end{array}
\]

**ECONOMIC IMPACT**

Antiarrhythmic drug therapy is cost effective and affordable in the short term, but can be costly over the long term.

Several studies show that AADs are cost effective, with key drivers including reduced adverse events, stroke, and mortality.\(^{30-32}\)

**INITIAL COST** of AAD treatment is LOW however **LENGTH of treatment** is INDEFINITE and the cumulative cost of AADs **INCREASES 28\% ANNUALLY over 9 years.**\(^{33}\)

Cost of AAD therapy is influenced by its **toxicity level** and effectiveness in restoring sinus rhythm and reducing the risk of AFib-related complications.\(^{30-32}\)

\(^{5}\)From one study performed in France; data were limited for the United States.

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**PATIENT IMPACT**

Antiarrhythmic drug therapy is effective at controlling symptoms of AFib and significantly improves patient quality of life.

**REDUCED SYMPTOMS WITH AADS\(^{34}\)**

<table>
<thead>
<tr>
<th>Symptom Frequency</th>
<th>Symptom Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(p=0.002)</td>
<td>(p=0.0001)</td>
</tr>
<tr>
<td>-13%</td>
<td>-38%</td>
</tr>
</tbody>
</table>

**IMPROVED QUALITY OF LIFE WITH AADS\(^{34}\)**

<table>
<thead>
<tr>
<th>Physical Component (p=0.001)</th>
<th>Mental Component (p=0.0001)</th>
</tr>
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<tbody>
<tr>
<td>+14%</td>
<td>+18%</td>
</tr>
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</table>

Abbreviations: AAD = antiarrhythmic drug, AFib = Atrial Fibrillation; SF-36 = Short Form 36 questionnaire.

Source: Jais et al. (2008)
What is the impact of catheter ablation in managing AFib?

Catheter ablation is used to create small scars on targeted parts of heart tissue that block the abnormal electrical signals causing the arrhythmia.\(^5,6\)

**CLINICAL IMPACT**
Catheter ablation is highly effective at maintaining sinus rhythm, is associated with a low rate of adverse events and reduced risk of AFib-related complications, including stroke, dementia, heart failure, and mortality.

- Catheter ablation is highly effective in eligible patients with AFib, with recent studies reporting high rates of freedom from atrial arrhythmias at one year with advanced catheter ablation technology.

After a single procedure **84%-94% FREEDOM** from atrial arrhythmias in **PAROXYSMAL AFib AT 1 YEAR**\(^55-37\)

**ECONOMIC IMPACT**
Catheter ablation is cost effective: it reduces the need for unplanned medical visits, additional treatments to control AFib, and subsequent treatment for long-term consequences of AFib, in turn, reducing overall healthcare cost.

**CATHETER ABLATION** reduces the need for unplanned ER visits and hospitalizations by up to **80%** as compared to before ablation\(^*\)\(^58, 44, 45\) (p<0.05)

**PATIENT IMPACT**
Catheter ablation is highly effective at controlling symptoms of AFib and significantly improves patient quality of life.

**Reductions** in symptom severity and improvements in quality of life after catheter ablation of AFib are **maintained over long-term follow-up**\(^30\)

**REDUCED SYMPTOMS**
**AFTER CATHETER ABLATION**

**IMPROVED QUALITY OF LIFE**
**AFTER CATHETER ABLATION**

**SOURCE:** Mark et al. (2019)
All results significant, where p<0.01
COMPARISON OF TREATMENTS

What is the impact of catheter ablation compared to drug therapy in managing AFib?

***Events per 100 person-years. HR: 0.70 (0.63–0.77) p<0.001

- **EFICACY**
  - **DRUG THERAPY (AADs)**
    - 33%–56% of patients are in NORMAL SINUS RHYTHM AT 1 YEAR
  - **CATHETER ABLATION**
    - Up to 94% of patients are FREE FROM ARRHYTHMIA RECURRENCE AT 1 YEAR

- **QUALITY OF LIFE**
  - **DRUG THERAPY (AADs)**
    - 18% IMPROVEMENT IN QUALITY OF LIFE
  - **CATHETER ABLATION**
    - 37% IMPROVEMENT IN QUALITY OF LIFE

- **ADVERSE EVENTS**
  - **DRUG THERAPY (AADs)**
    - 12%–19% of patients WITHDRAW FROM MEDICAL THERAPY due to adverse events
  - **CATHETER ABLATION**
    - 1.8% of ablation patients experience AN ABLATION-RELATED adverse events

- **COMPLICATING CONDITIONS RELATED TO AFIB**
  - Patients receiving drug therapy will experience 5.57 AFib-related events per 100 person-years including DEATH, STROKE, CARDIAC ARREST AND CARDIOVASCULAR HOSPITALIZATION
  - Patients receiving ablation will experience 30% FEWER AFIB-RELATED EVENTS, with an average of 3.84 AFib-related events per 100 person-years

- **CUMULATIVE COSTS**
  - Up to 33%

- **COSTS**
  - **LOW INITIAL COST**
  - **CUMULATIVE COSTS** can rise over time with costs increasing ANNUALLY over 9 years
  - **PROJECTING COSTS TO 10 YEARS AFTER ABLATION**
    - Catheter ablation was associated with a 35% SAVINGS

Earlier treatment of Paroxysmal AFib delays disease progression.

Patients with Paroxysmal AFib who undergo catheter ablation are UP TO 10X less likely to progress to persistent AFib than those on AADs.
The 2014 AHA/ACC/HRS guidelines on the management of AFib and the 2017 HRS/EHRA/ECAS/APHRS/SOLACE expert consensus statement on catheter and surgical ablation of AFib recommend an integrated management strategy to reduce mortality, tailor management to patient preferences, and reduce hospitalizations.

AFib patient care pathway management includes:

<table>
<thead>
<tr>
<th>MANAGEMENT</th>
<th>to improve life expectancy and quality of life</th>
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<tr>
<td>of underlying cardiovascular risk factors and REDUCING STROKE RISK</td>
<td></td>
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<td>ELECTRICAL OR PHARMACEUTICAL CARdioversion</td>
<td>when a patient is experiencing an AF episode</td>
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<tr>
<td>RATE CONTROL THERAPIES</td>
<td>to control heart rate</td>
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<td>RHYTHM CONTROL THERAPIES</td>
<td>including antiarrhythmic drugs and catheter ablation, to maintain normal sinus rhythm</td>
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When MULTIDISCIPLINARY AF TREATMENT TEAMS were utilized to select appropriate treatment for AF patients, significant reductions in health resource utilization, inpatient admission rate and length of stay were observed. Education and screening programs aimed at INCREASING AWARENESS AND DIAGNOSIS OF AFIB are critical to reducing the risk of stroke and death in patients with undiagnosed AFib.

EARLIER ABLATION OF AFIB after diagnosis improves ablation-related outcomes and may reduce costs over the long term. Catheter ablation is more effective than drug therapy at preventing AFib recurrence, complicating conditions related to AFib, provides a significantly greater improvement in quality of life, and is less costly over the long term:

<table>
<thead>
<tr>
<th>Antiarrhythmic drug (AAD) therapy is MODERATELY EFFECTIVE. It is commonly associated with treatment withdrawals, however, it has been shown to improve quality of life, and is affordable in the short term.</th>
<th>With drug therapy treatment:</th>
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<td>of patients are in NORMAL SINUS RHYTHM AT 1 YEAR</td>
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Catheter ablation is HIGHLY EFFECTIVE, associated with a low rate of procedure-related adverse events, and has been shown to reduce the rate of AFib-related complications. It has also been shown to improve quality of life, and reduce resource utilization.

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<th>With catheter ablation treatment:</th>
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| Catheter ablation is more effective than drug therapy at preventing AFib recurrence, complicating conditions related to AFib, provides a significantly greater improvement in quality of life, and is less costly over the long term: |
|---------------------------------------------------------------------------------------------------------|-----------------------------|
| Up to 48% improvement in survival FREE FROM ATRIAL ARRHYTHM over 4 years after ablation, as compared to drug therapy | Patients with Paroxysmal AFib who undergo catheter ablation are Up to 10X LESS LIKELY TO PROGRESS TO PERSISTENT AFIB than those on AADs |

*(HR 0.11; 95% CI 0.025-0.483; p=0.0034)*

*LOW RATES*

OF COMPLICATIONS compared with drug therapy.

<table>
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<th>Education and screening programs aimed at INCREASING AWARENESS AND DIAGNOSIS OF AFIB</th>
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*LOW RATES*

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REFERENCES


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