

Electrophysiology
Update:
Atrial Fibrillation

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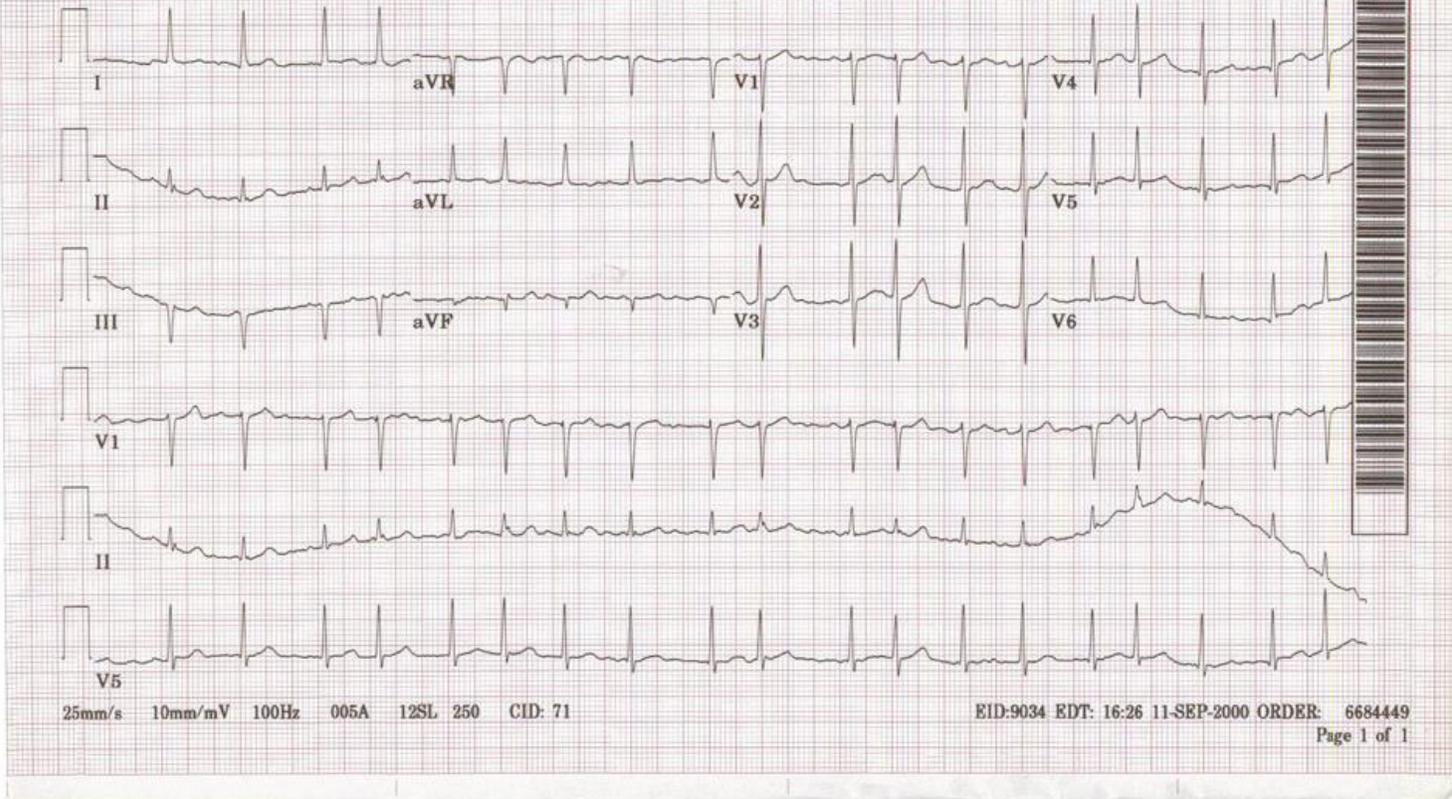
Disclosures

- None

A 63 year old man with shortness of breath after a viral infection.....

- **A 63-year-old man is discovered to have atrial fibrillation during an evaluation for a viral respiratory infection.**
- **He reports that 3 months earlier he began noticing occasional dyspnea on climbing stairs, and walking his dog and this symptom has been persistent for the past month.**
- **He has a smart watch and has been receiving alerts for irregularity**
- **On physical examination, the body-mass index is 34, the blood pressure is 142/88 mm Hg, the pulse is irregular at 80 beats per minute, and there are irregular first and second heart sounds.**

Referred by: Dept. Emergency-Room Confirmed by:



His EKG....
How would
you treat this
patient?

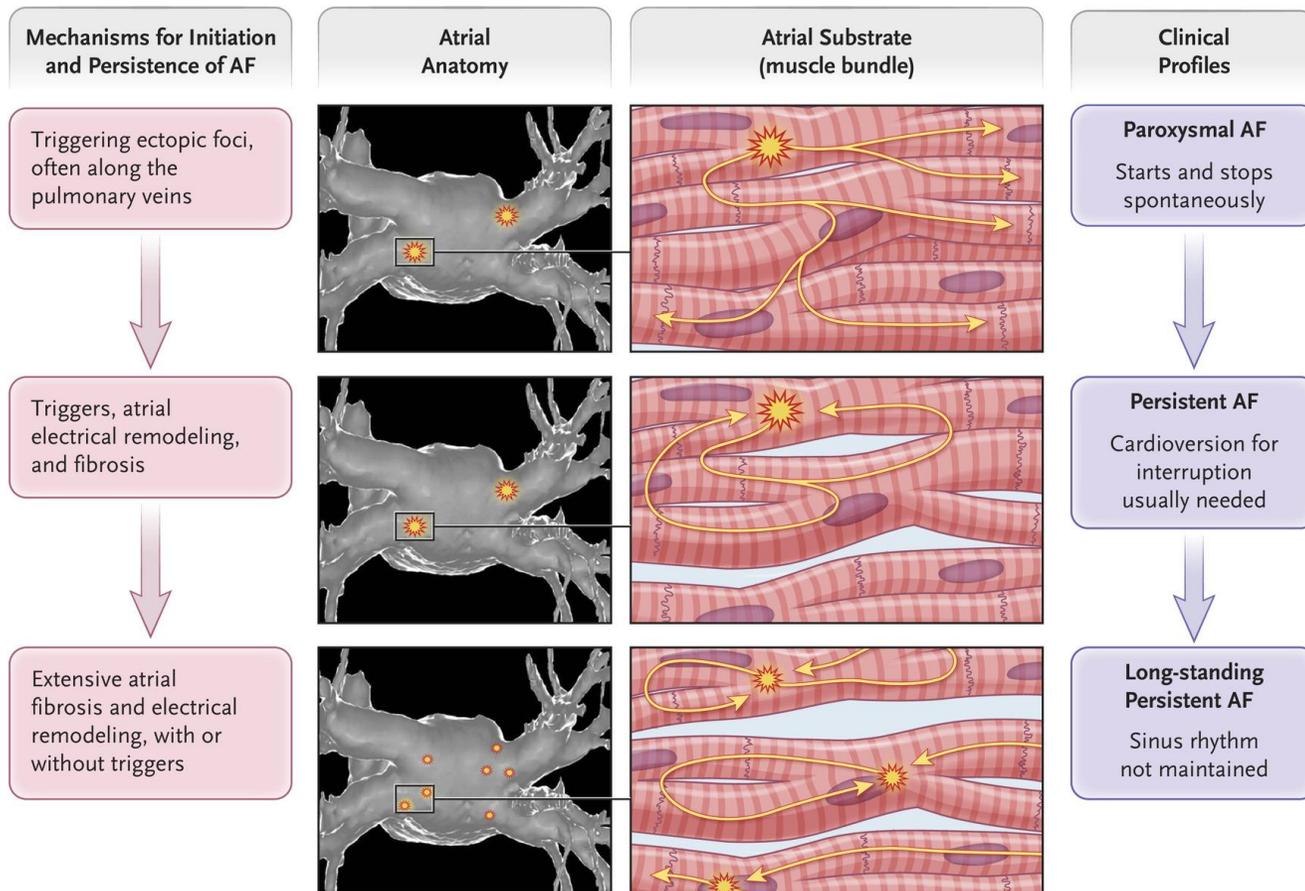
Atrial Fibrillation

- The most common sustained arrhythmia encountered in adults.
- Among patients in the Framingham Heart Study population, atrial fibrillation developed in 37% of adults > 55 years old
- Risk factors include older age, coronary artery disease, male sex, hypertension, obesity, smoking, diabetes mellitus, obstructive sleep apnea, and a family history of atrial fibrillation in a first-degree relative.
- In a large multi-institutional study, 19% of the patients with newly diagnosed atrial fibrillation had an acute precipitant such as pneumonia or surgery (the two most common precipitants), myocardial infarction, pulmonary embolism, thyrotoxicosis, or alcohol intoxication.

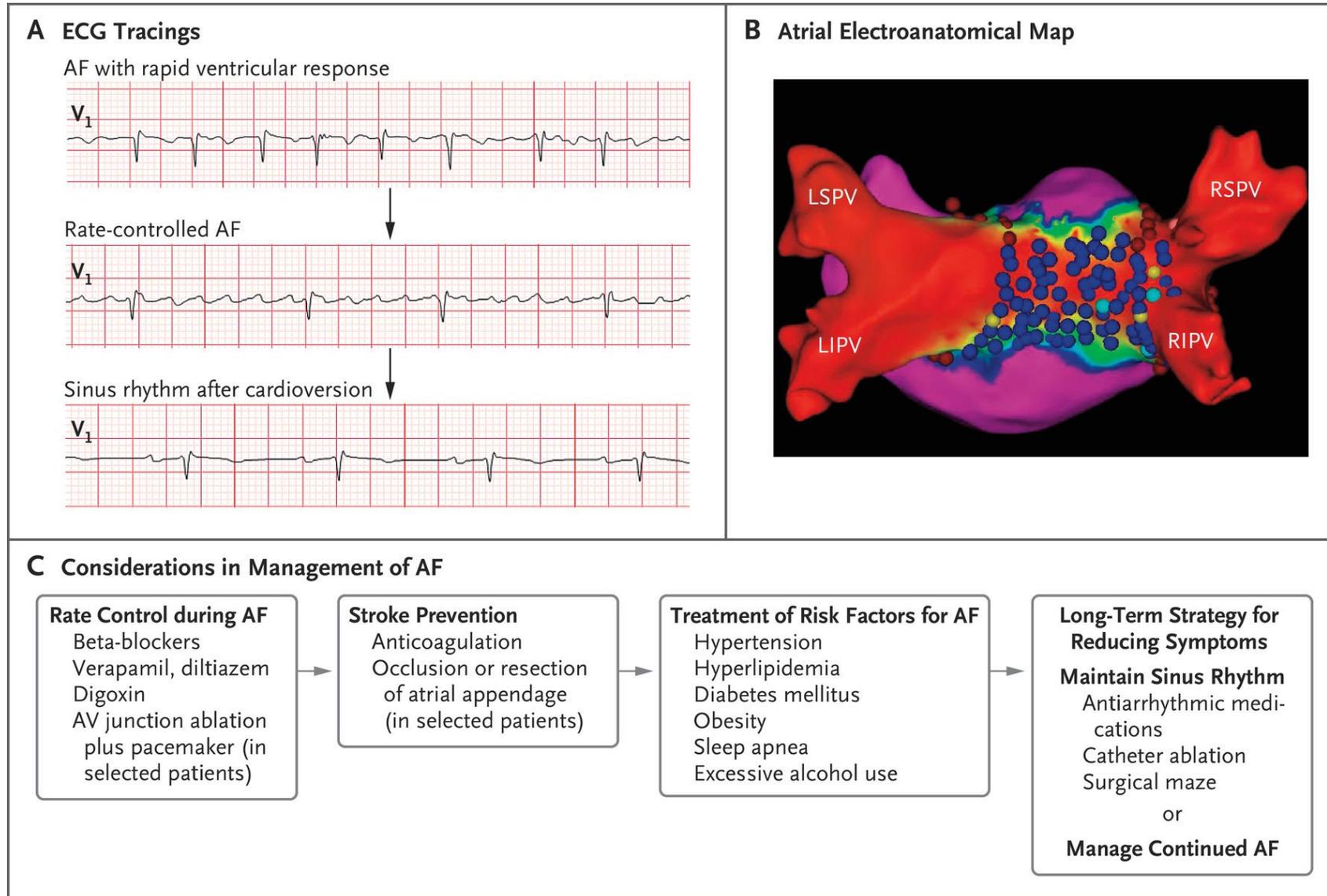
Clinical Consequences of Atrial Fibrillation

- AF is associated with an increased incidence of stroke heart failure and dementia
- Atrial fibrillation increases the risk of death by a factor of 2.4 among men and by a factor of 3.5 among women.

Atrial Fibrillation Mechanisms



Management of Atrial Fibrillation



Can we believe our Smartwatches? The Apple Heart Study

Table 2. End-of-Study Survey.

Variable	Notification Subgroup (N=929)	Non-notification Subgroup (N=293,015)
New diagnosis — no. (%)		
Atrial fibrillation	404 (43)	3070 (1.0)
Stroke	7 (0.8)	321 (0.1)
TIA	12 (1.3)	498 (0.2)
Heart failure	30 (3.2)	648 (0.2)
Myocardial infarction	10 (1.1)	574 (0.2)
Major bleeding	7 (0.8)	842 (0.3)
Medication use — no. (%)*		
Warfarin	20 (2.2)	265 (0.1)
Direct oral anticoagulant	202 (22)	996 (0.3)
Aspirin	338 (36)	40,774 (14)

* This category refers to medication use since enrollment in the study, as reported by the participants.

- optical sensors (Apple Watch Series 1 through 3) were used to detect an irregular pulse and a proprietary algorithm to indicate arrhythmia
- 34% of individuals (0.5%) who received a notification of arrhythmia were later found to have atrial fibrillation (AF)
- the positive predictive value in participants notified of an irregular pulse was 0.84.

Apple Watch 4, Post Op Patients on Telemetry

- In Apple's internal study of 588 subjects, >98% sensitivity and >99% specificity.
- Gillinov et al observed 50 post op CABG patients at Cleveland Clinic

Table. Rhythm Detection by the AW4 in 90 Instances of Telemetry-Confirmed AF

	AF, n (%)	SR, n (%)	Inconclusive, n (%)	No Reading, n (%)	Sensitivity, %	Specificity, %
Apple Watch notification/display	34 (38)	27 (30)	29 (32)	0 (0)	41	100
Apple Watch PDF interpretation	84 (93)	0 (0)	0 (0)	6 (7)	96	100

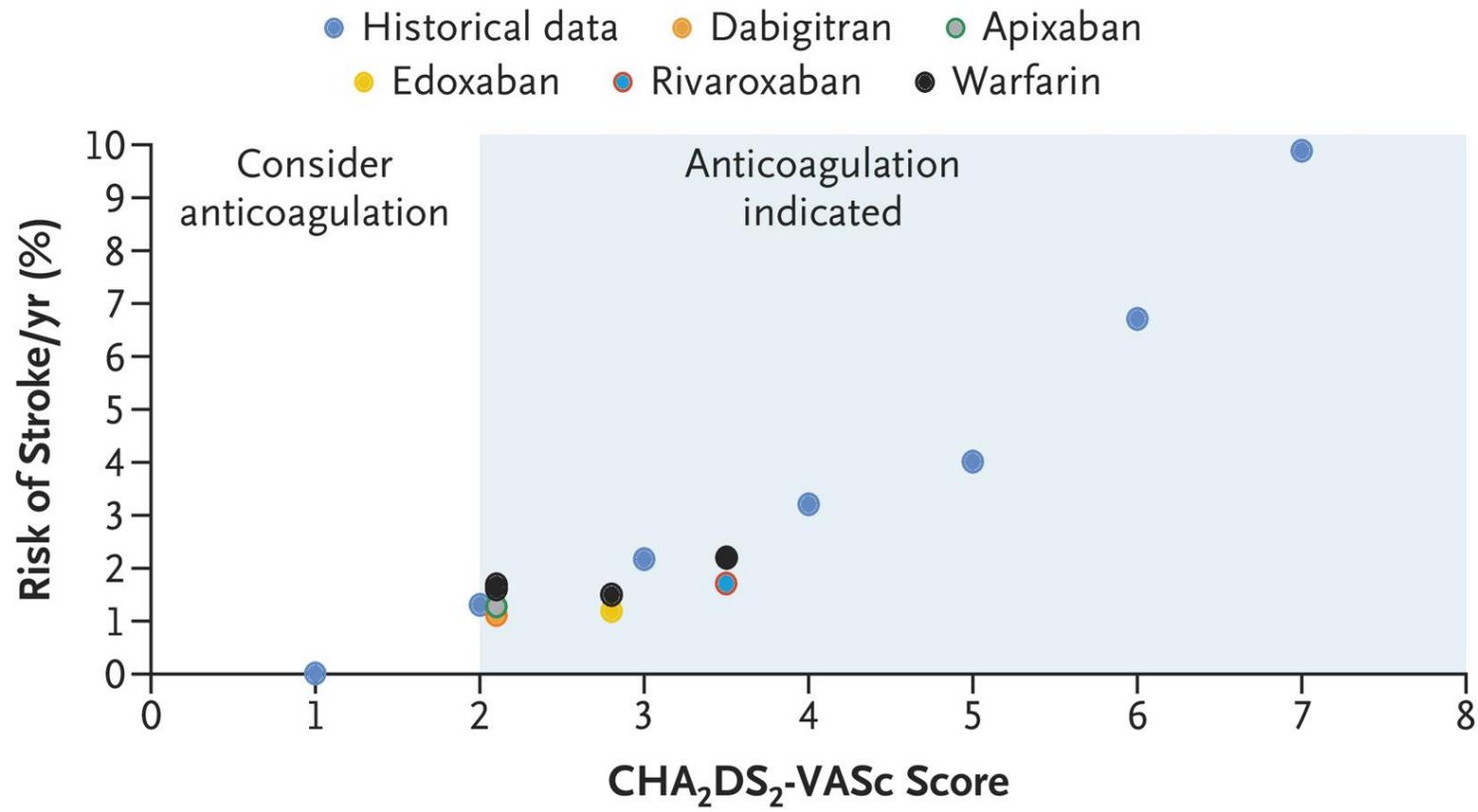
AF indicates atrial fibrillation; AW4, Apple Watch 4; and SR, sinus rhythm.

Rhythm was assessed with the Apple Watch 4 in 2 distinct fashions: notification/display on the watch face and offline interpretation of the PDF of the rhythm waveform stored by the Apple Heart App.

Atrial Fibrillation: Stroke Prevention

Anticoagulation is first-line therapy for prevention of thromboembolism, and its use is guided by estimation of stroke risk according to the CHA₂DS₂-VASc score

Anticoagulation is indicated for patients who have at least two risk factors (i.e., an estimated stroke risk >2.2% per year) and should be considered for patients who have one risk factor other than female sex (i.e., estimated stroke risk of ≥1.3% per year).



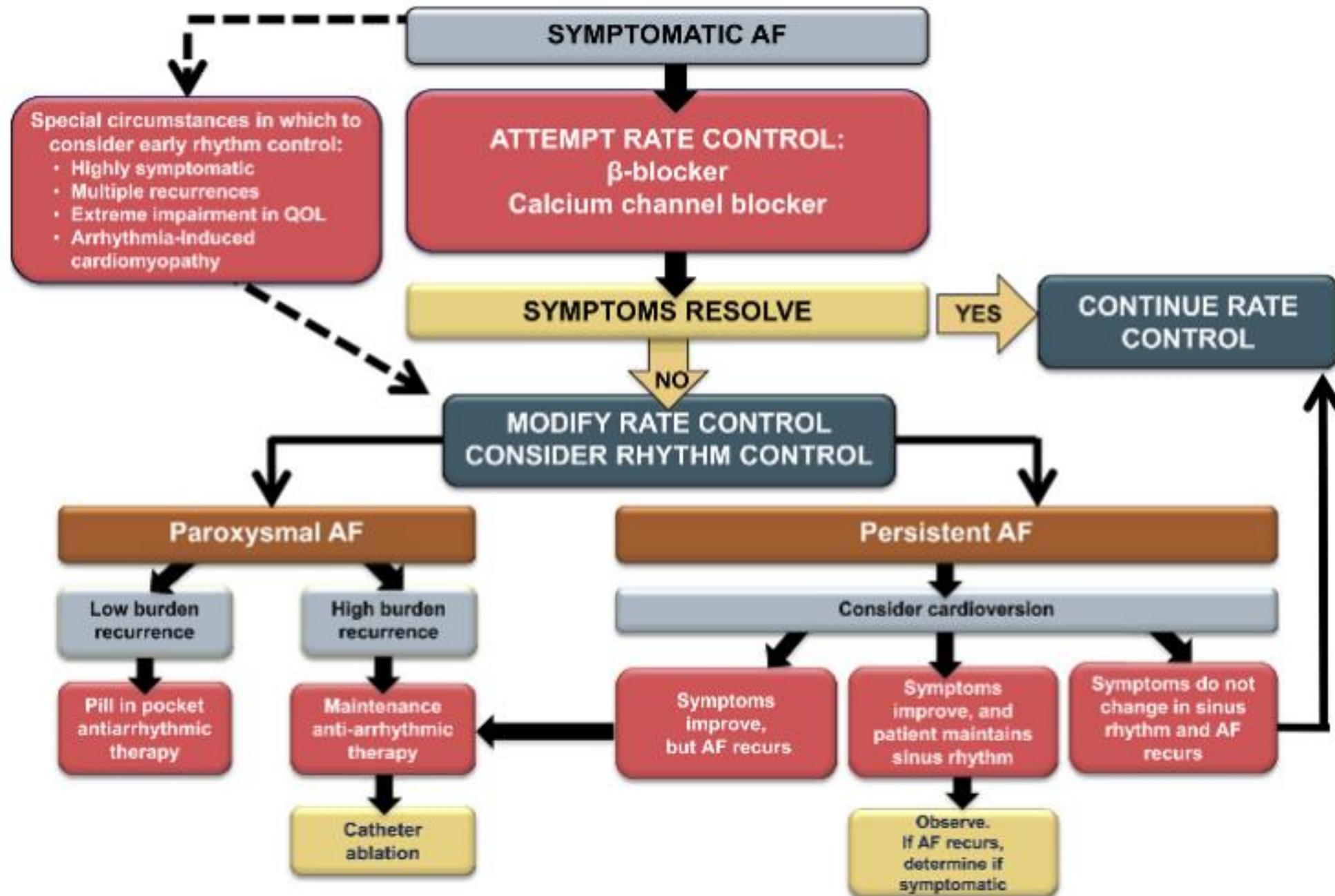
CHA ₂ DS ₂ -VASc	Points
Congestive heart failure	1
Hypertension	1
Age ≥75 yr	2
Diabetes mellitus	1
Stroke, TIA, or thromboembolism	2
Vascular disease	1
Age 65–74 yr	1
Female sex	1

Back to our patient

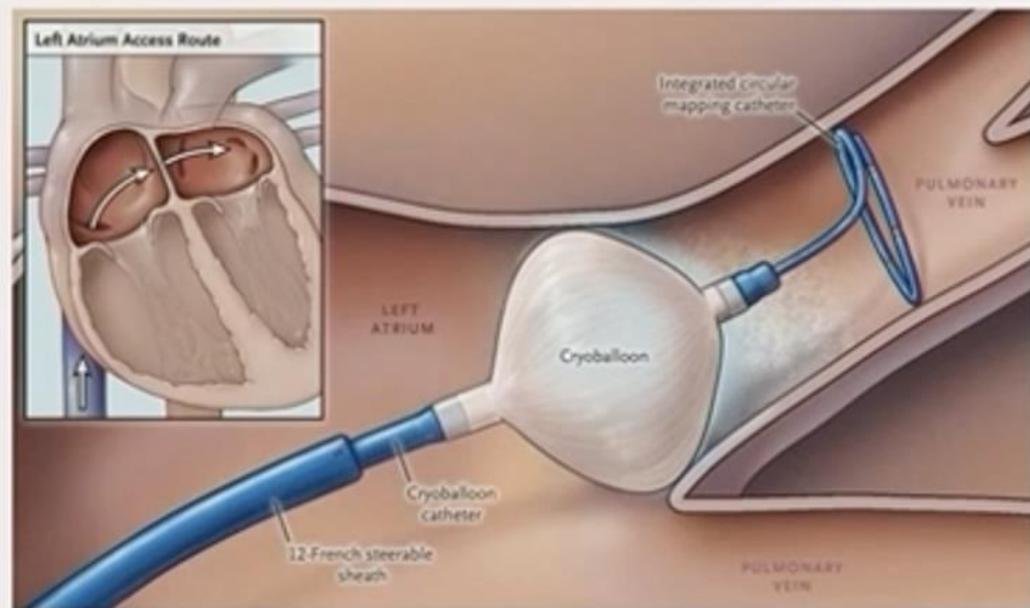
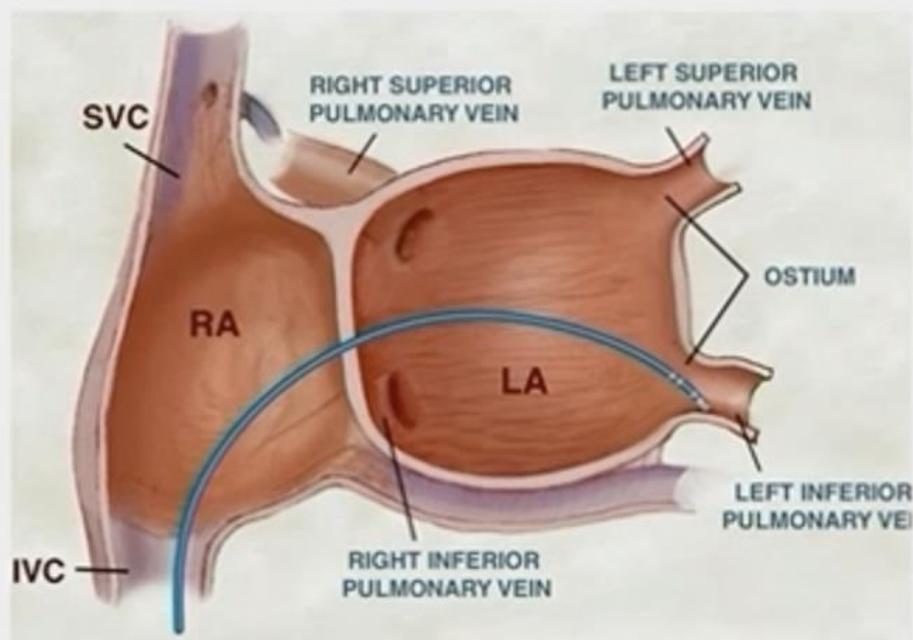
The same patient from the previous question was initiated on Metoprolol and Apixaban. Over the following 3 months, he experiences more-frequent episodes of palpitations and dyspnea with exertion. His wife has now taken over the dog-walking duties as a result. A 24-hour Holter monitor demonstrates atrial fibrillation (Afib) with mean rate 90 bpm and range 45-160 bpm.

- A. Perform cardioversion and initiate amiodarone
- B. Perform catheter ablation
- C. initiate diltiazem
- D. Continue current therapy
- E. Implant a pacemaker and initiate diltiazem.

Algorithm for Rate vs Rhythm Control for Patients With Symptomatic AF



Current Catheter Ablation Technologies



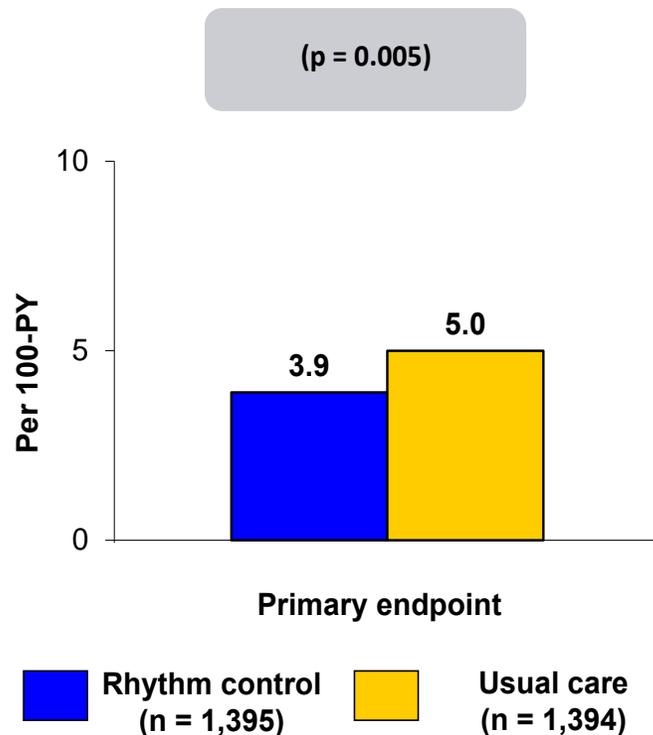
EAST-AFNET 4

#ESC Congress



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CARDIOLOGY

Trial Description: Patients with AF diagnosis within 1 year were randomized in a 1:1 fashion to either rhythm control or usual care. Early rhythm control required antiarrhythmic drugs/ablation/cardioversion. Usual care was initially treated with rate control therapy without rhythm control. Patients were followed for 5.1 years.



RESULTS

- Primary outcome, CV death, stroke, hospitalization for HF or ACS, rhythm control vs. usual care: 3.9 vs. 5.0/100 P-Y; HR 0.79, 95% CI 0.66-0.94 (p = 0.005)
- CV death: 1 vs. 1.3/100-PY; HR 0.72, 95% CI 0.52-0.98; stroke: 0.6 vs. 0.9/100-PY; HR 0.65; 95% CI 0.44-0.98; HF hospitalization: 2.1 vs. 2.6/100 P-Y
- Sinus rhythm: 82.1% vs. 60.5% (p < 0.05)

CONCLUSIONS

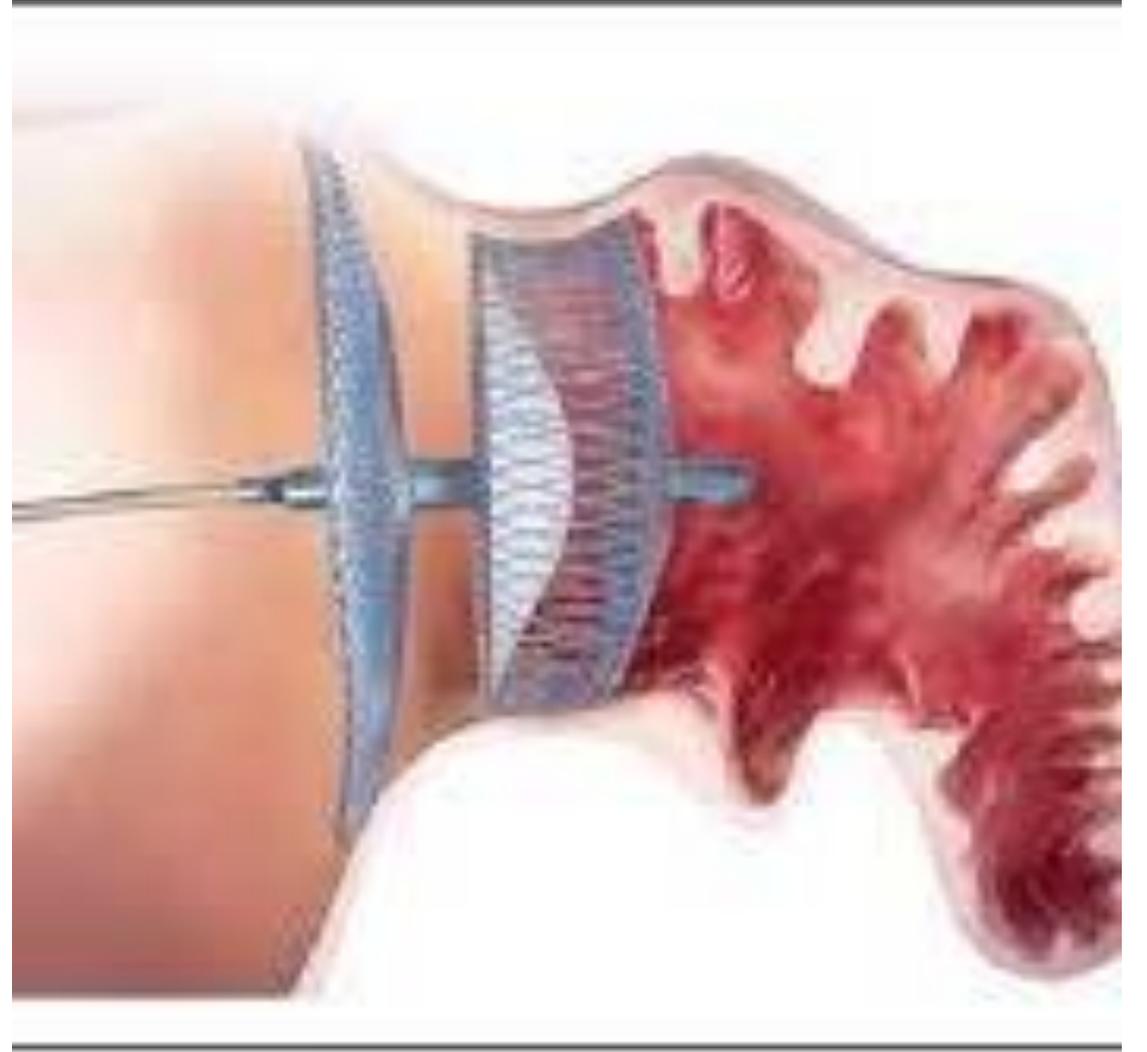
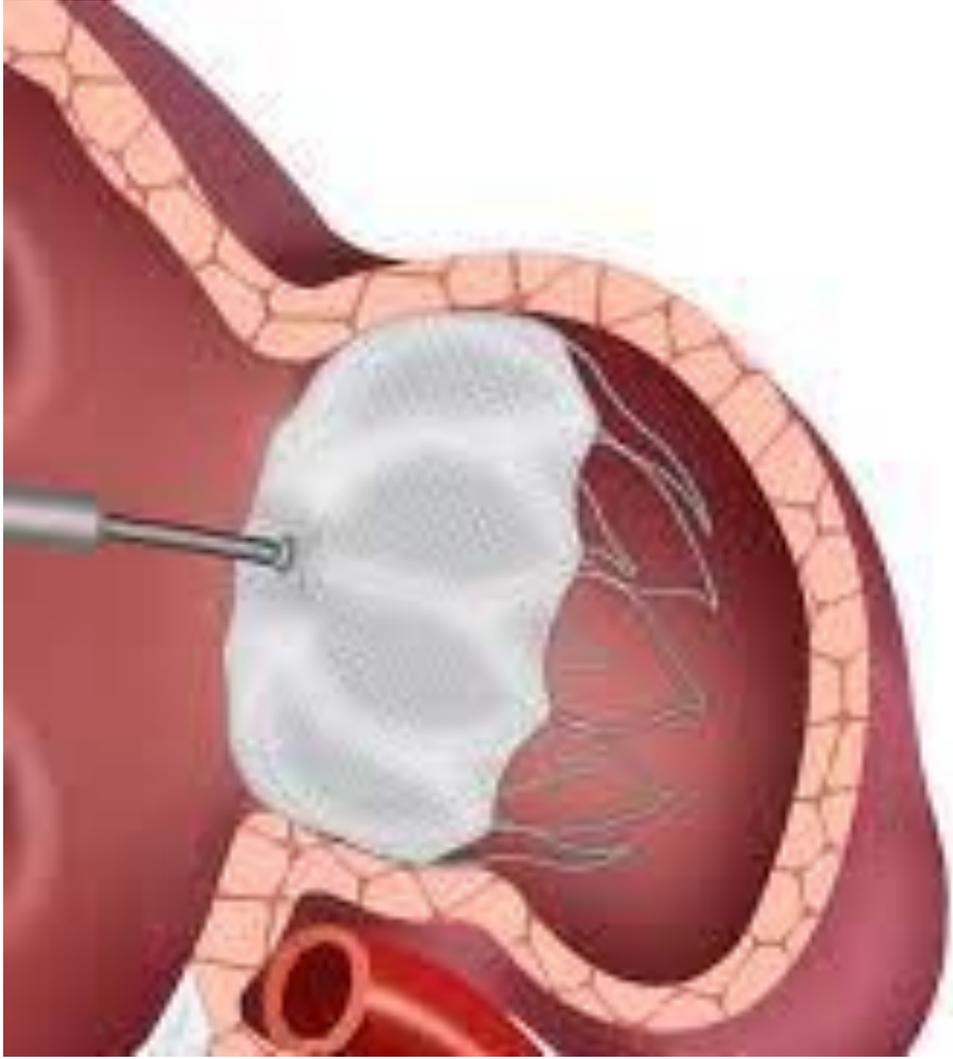
- A rhythm control strategy is superior to usual care (rate control in the majority of cases) in improving CV outcomes at 5 years among patients with recent diagnosis of AF and concomitant CV conditions; significant reductions were noted for the primary composite endpoint, as well as for CV death and stroke
- Results of this trial are different from other similar trials such as CABANA-AF, AFFIRM, and RACE; differences will need to be further assessed

Kirchhof P, et al. *N Engl J Med* 2020;383:1305-16

A 76 year old man...

A 76-year-old man is referred for further discussion regarding long-term stroke prophylaxis in the context of atrial fibrillation (Afib). He was previously on apixaban 5 mg twice daily for anticoagulation; however, he had an acute intracranial hemorrhage 6 months earlier in the setting of hypertensive emergency, at which time apixaban was discontinued. He has recovered completely from his intracranial bleed with no residual deficits. Which one of the following is the best next step to manage his stroke risk?

- A. Start warfarin, with target international normalized ratio 2.0-3.0.
- B. Resume apixaban
- C. Percutaneous left atrial appendage occlusion.
- D. Start aspirin 325 mg daily.



221 Patients with High Risk AF and Clinical Indication to LAAC

Aged **76.9** (± 7.8) years
39.4% with prior stroke/TIA
 CHA2DS2VASc Score **4.3** ± 1.4

29.4% women
87.8% with prior relevant bleeding
 HASBLED Score **3.1** ± 0.9

AMULET
(n=111)

WATCHMAN FLX
(n=85)

Watchman 2.5
(n=25)
 BEFORE October 2019

RANDOMIZED

45-day LAA Patency

CCTA
(Primary Endpoint)

INTRADEVICE LEAK

44.8% vs. 23%; p= 0.001

67.6% **70%**

MIXED LEAKS

3.8% vs. 14%; p=0.010

TEE
(Secondary Endpoint)

Peridevice Leak **13.7%**

27.5% Peridevice Leak

Clinical outcomes

(Secondary Endpoints)

Major Bleeding **7.2%**
Cardiac Tamponade **2.7%**

9.0%

Procedural Complications

2.7%

1.8% Major Bleeding
0% Cardiac Tamponade

CVD/Stroke/SE
Major Bleeding

2.7%
8.1%

45-day clinical outcomes

4.5%
6.4%

CVD/Stroke/SE
Major Bleeding

4.5%
6.4%

Atrial Fibrillation, Closing Thoughts

- Atrial fibrillation is associated with underlying heart disease and with increased risks of death, stroke, heart failure, and dementia.
- Therapy for conditions that are associated with a risk of atrial fibrillation, including hypertension, hyperlipidemia, diabetes mellitus, sleep apnea, obesity, and excessive alcohol consumption, may reduce the risk of recurrence of atrial fibrillation.
- The presence or absence of risk factors for stroke is used to estimate the risk of stroke in order to determine whether anticoagulation is indicated for paroxysmal or persistent atrial fibrillation.
- When atrial fibrillation has been present for 48 hours or longer or for an unknown duration and elective cardioversion is planned, a period of anticoagulation before and after cardioversion is warranted, even when risk factors for stroke are absent.
- Uncontrolled tachycardia can lead to deterioration of left ventricular function. Attempts to maintain sinus rhythm should be considered when atrial fibrillation has not been persistent for more than 1 year or is paroxysmal and symptomatic. Catheter ablation is more effective than antiarrhythmic drug therapy, particularly for paroxysmal atrial fibrillation.

