

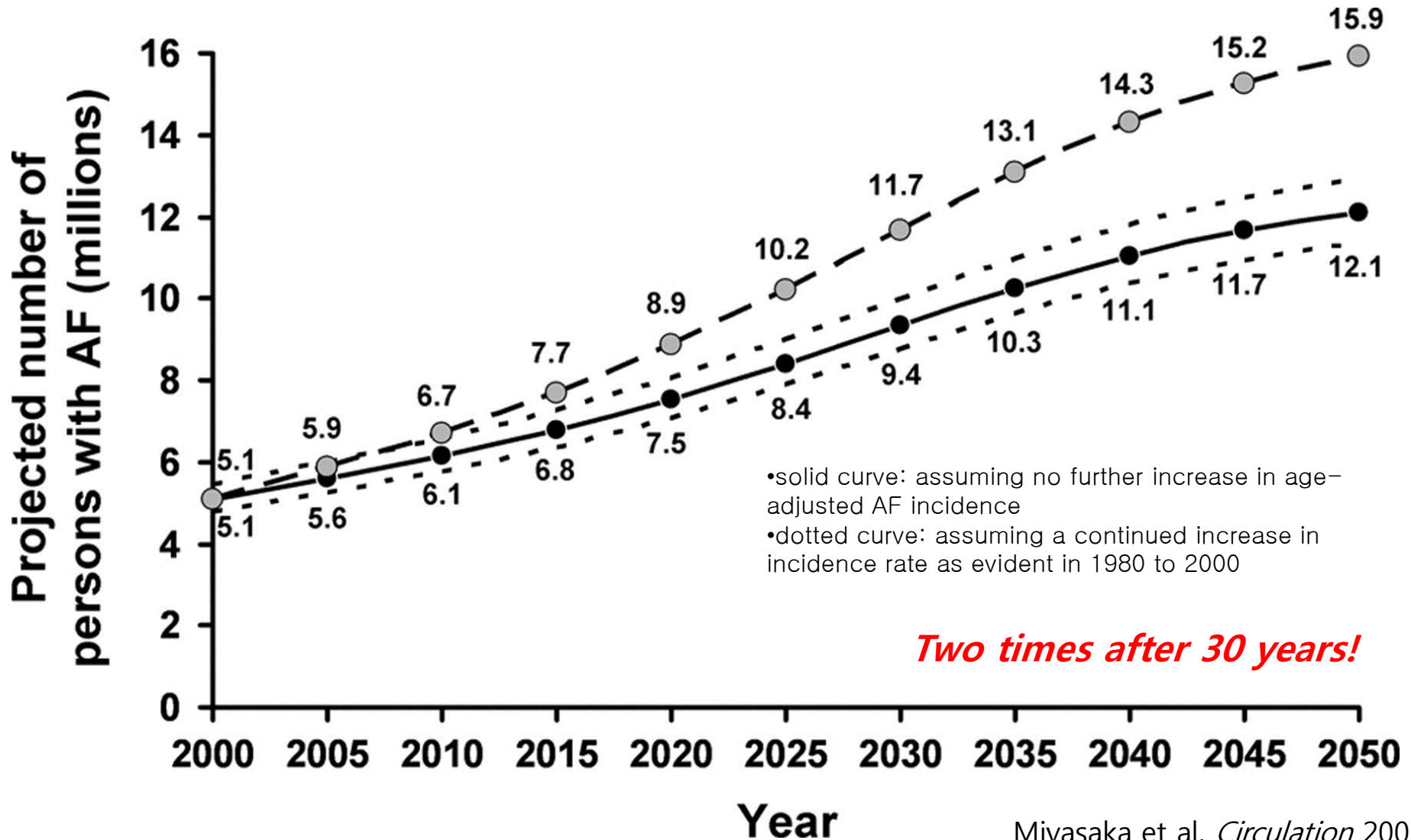
Atrial Fibrillation and Decompensated Heart Failure

Kim, Sung-Hwan, MD.

Seoul St. Mary's Hospital

The Catholic University of Korea

AF is increasing



Miyasaka et al, *Circulation* 2006

Problems of AF (with HF)

- **Decreased pump function**
 - loss of atrial contraction, AV dyssynchrony, tachycardia induced cardiomyopathy
- **Stroke**, side effects of anticoagulation
- Symptom; palpitation, dyspnea, general weakness
- hospitalization

AF -> more severe stroke !

Stroke Severity	All Ages	
	AF (n=103)	Non-AF (n=398)
None	21%	19%
Mild	21%	26%
Moderate	17%	26%
Severe	14%	14%
Fatal	25%	14%
<i>P</i> *	.048	

The Framingham study, Lin et al, *Stroke* 1996

Treatment strategies of AF

- aspirin vs. warfarin (NOAC)
- rate vs. rhythm

Strategy (1) – antithrombotic

- As CHA₂DS₂-VASc score, in non-valvular AF
 - **C**ongestive heart failure (1)
 - **H**ypertension (1)
 - **A**ge (>75) (2)
 - **D**iabetes (1)
 - **S**troke (2)
 - **V**ascular disease
 - **A**ge (65~74) (1)
 - **S**ex (female) (1)
- 0 : no or aspirin, 1 : aspirin or warfarin, ≥ 2 : warfarin

Non-valvular AF ?

- **Mitral stenosis**, mechanical valve, HCMP
 - ⇒ High risk of thrombus
 - ⇒ Absolute indication of warfarin
- Non-valvular AF
 - The other
 - ex.) severe MR, severe AR...

Strategy (2) – Rate vs. Rhythm

- **Rate control drug**

- **Beta blocker (bisoprolol, carvedilol, esmolol...), digoxin, CCB (diltiazem, verapamil)**

- **Antiarrhythmic drug**

- **Ic drug (flecainide, propafenone)**
- **III drug (amiodarone)**
- **RFCA (radiofrequency catheter ablation)**
- **MAZE, thoracoscopic**

A COMPARISON OF RATE CONTROL AND RHYTHM CONTROL IN PATIENTS WITH ATRIAL FIBRILLATION

THE ATRIAL FIBRILLATION FOLLOW-UP INVESTIGATION OF RHYTHM MANAGEMENT (AFFIRM) INVESTIGATORS*

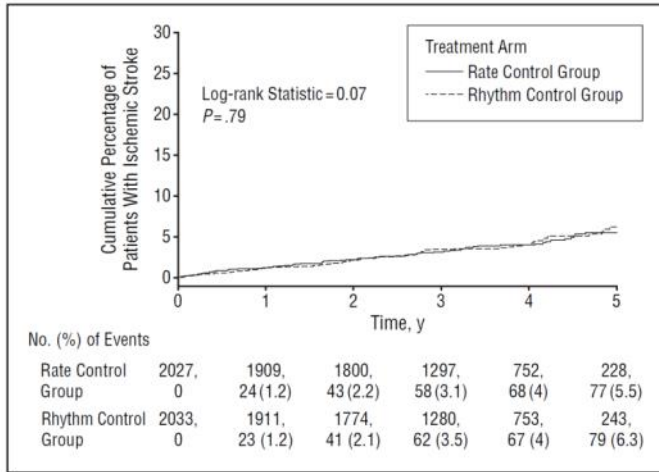


Figure 2. Ischemic stroke over time. The values are given as the number of patients, the number of events, and the percentage of events for the given period in the accompanying chart.

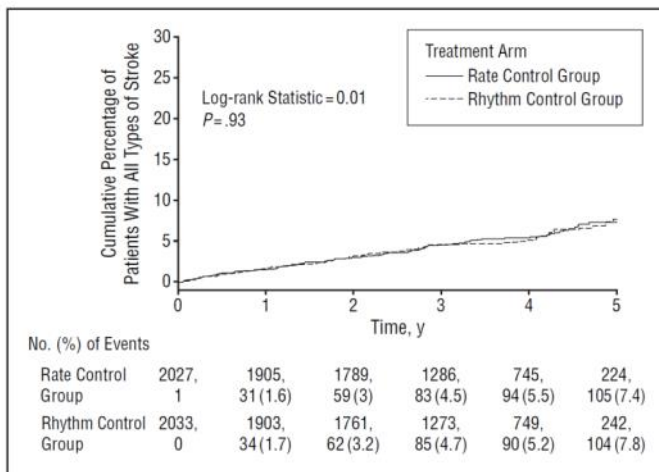
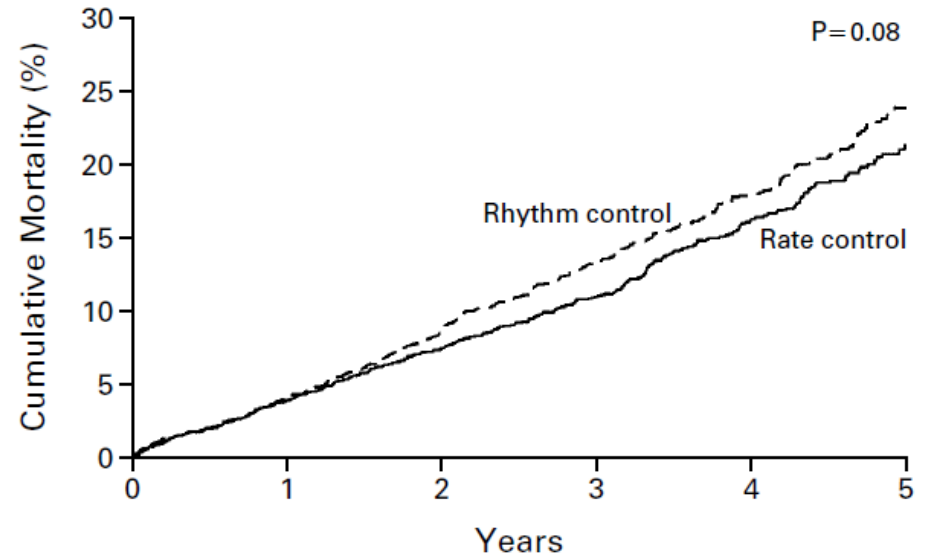


Figure 3. All strokes over time. The values are given as the number of patients, the number of events, and the percentage of events for the given period in the accompanying chart.

	NO. OF DEATHS					
		number (percent)				
Rhythm control	0	80 (4)	175 (9)	257 (13)	314 (18)	352 (24)
Rate control	0	78 (4)	148 (7)	210 (11)	275 (16)	306 (21)

NEJM 2002

***rhythm control 군 중 40% 가
rate control 군으로 cross over !***

Arch Intern Med. 2005

On-treatment analysis of AFFIRM - stroke

Covariate	<i>P</i> Value	HR (95% CL)	Increase or Decrease in Risk, %
Age	.02	1.02 (1.00, 1.04)	+2 (per year of age)
Female sex	.003	1.66 (1.19, 2.31)	+66
Duration of qualifying episode ≥ 2 d	.02	1.61 (1.08, 2.40)	+61
Stroke or TIA	.006	1.78 (1.19, 2.68)	+78
Diabetes mellitus	.01	1.62 (1.11, 2.35)	+62
AF	.01	1.60 (1.11, 2.30)	+60
Warfarin sodium therapy	<.001	0.31 (0.21, 0.46)	-69

Arch Intern Med. 2005

On-treatment analysis of AFFIRM - death

Covariate	P	HR	HR: 99% Confidence Limits	
			Lower	Upper
Age at enrollment*	<0.0001	1.06	1.04	1.08
Coronary artery disease	<0.0001	1.65	1.31	2.07
<u>Sinus rhythm</u>	<0.0001	0.54	0.42	0.70
Warfarin use	<0.0001	0.47	0.36	0.61
<u>Digoxin use</u>	<0.0001	1.50	1.18	1.89
<u>Rhythm-control drug use</u>	0.0005	1.41	1.10	1.83

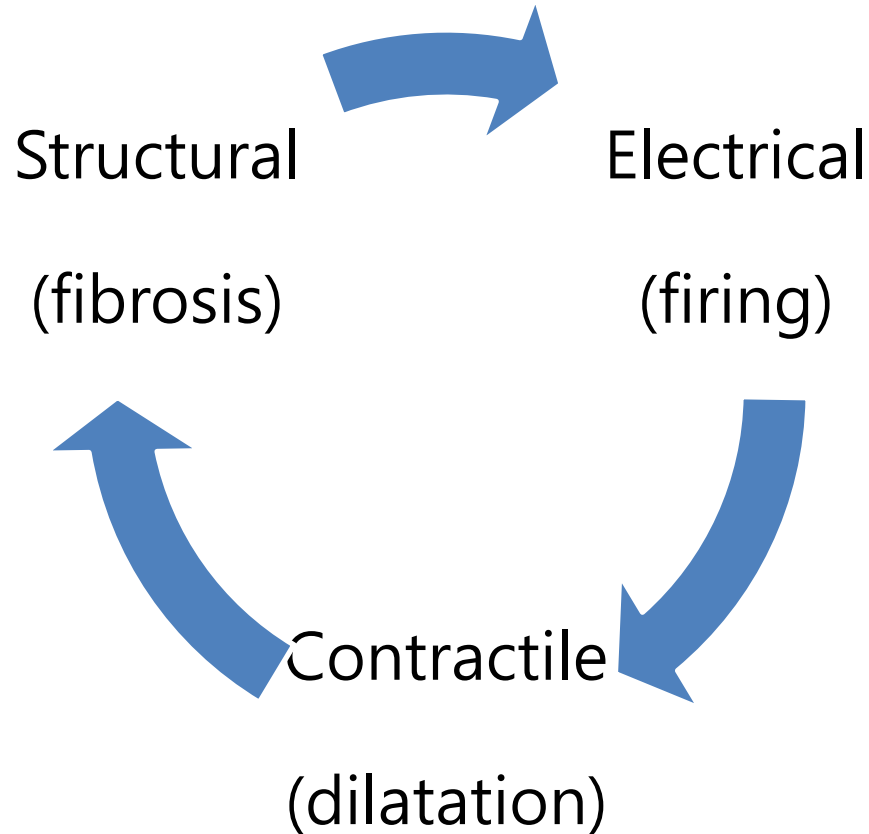
Consistent with the original intention-to-treat analysis, Anti-arrhythmic drug were no longer associated with mortality when SR was removed from the model.

Arch Intern Med. 2005

Messages from AFFIRM trial

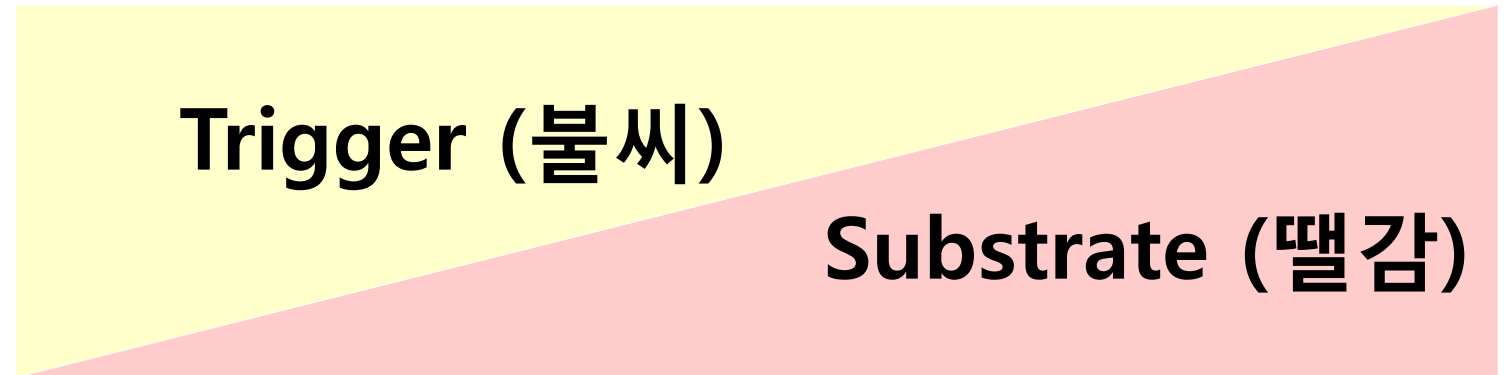
- Sinus 로 유지만 된다면, rhythm control strategy 가 stroke 예방에 확실히 좋다.
 - 잘 유지될 것 같은 환자들을 골라서 rhythm control 하자
- Sinus 로 유지된다고 한들, mortality 는 차이 없다.
 - 항부정맥제는 역시 위험한 약이다.

AF begets AF by atrial remodeling



Mechanism of AF

Paroxysmal AF -----> Permanent AF



Rhythm favor

Rate favor

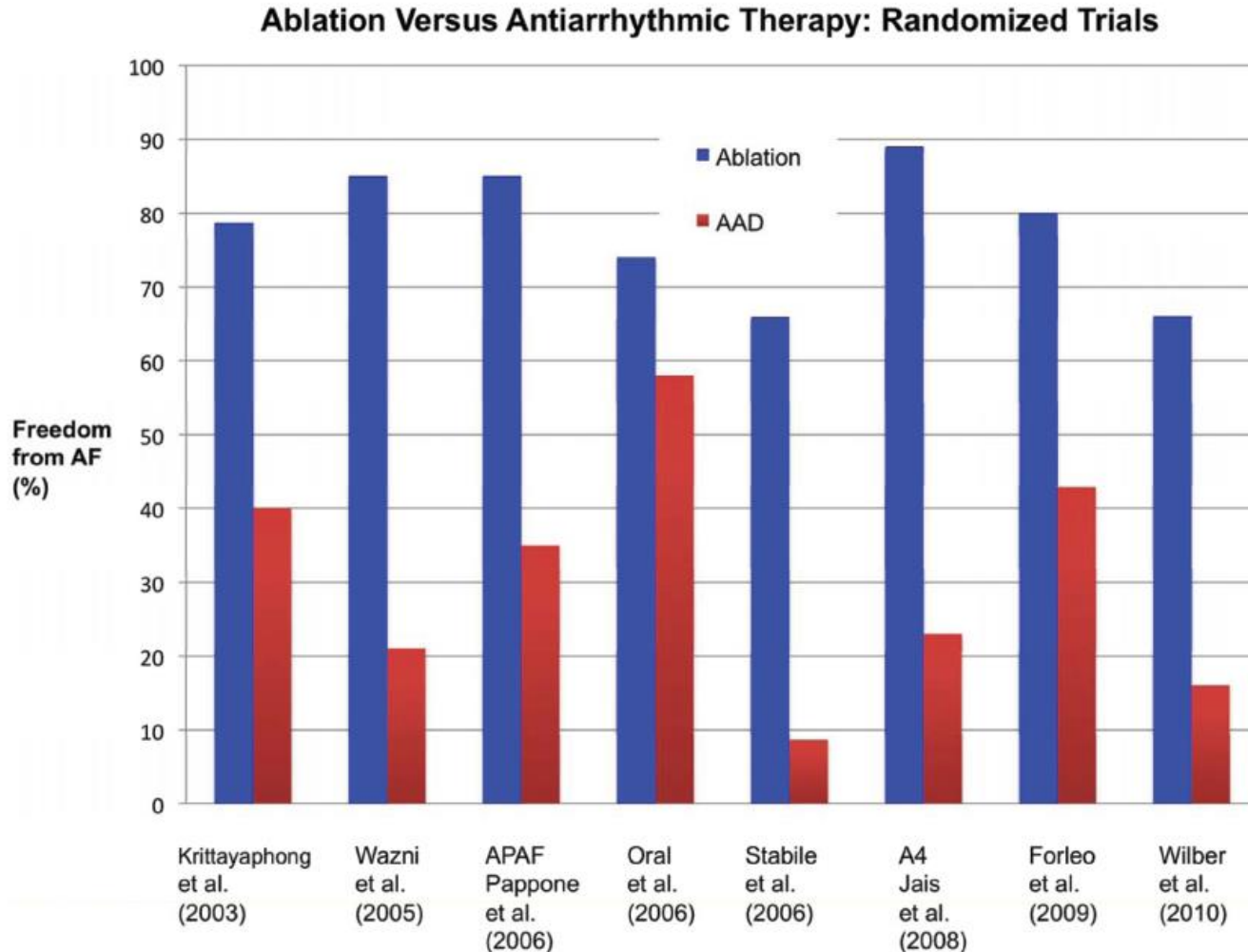
Rhythm control favor

- Probability of sinus maintenance
 - Paroxysmal, not long-standing, LA < 45~50 mm
- Young
- Severe symptom
- AF complication (= stroke)

Classification of AF

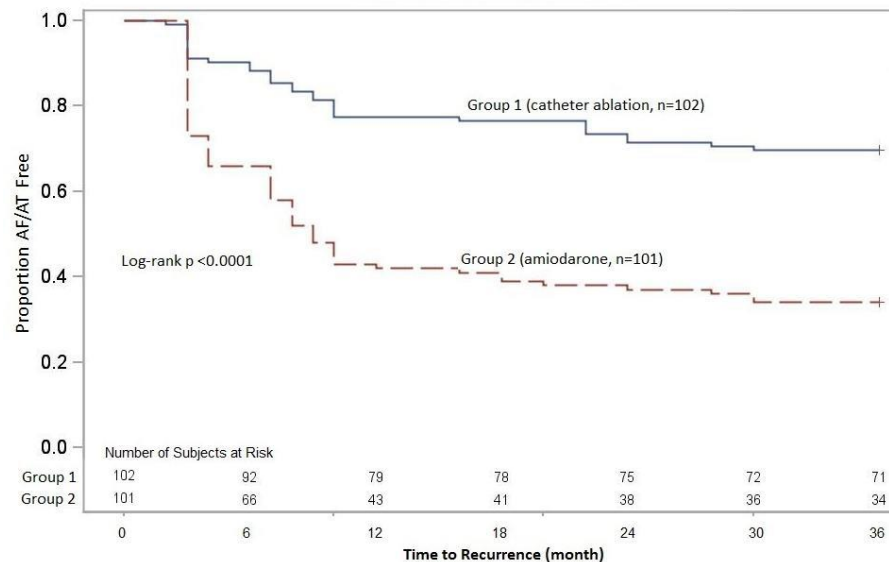
	Paroxysmal	Persistent	Long-standing persistent	permanent
Definition (duration)	Spontaneous termination	> 7d	> 12m	Acceptance of AF rhythm
Possibility of Rhythm control	+++	++	+	-

Ablation vs. Antiarrhythmic drug



Ablation vs. Amiodarone for AF + CHF

- Target (n=203): paroxysmal AF, EF ≤ 40% (Class II, III), with ICD
- Primary endpoint: AF free survival (2 yr)
- Secondary endpoints: mortality, QoL, EF change...



AATAC trial, Late breaking in ACC 15.

Ablation vs. Amiodarone for AF + CHF

- LVEF improved 9.67.4%, vs. 4.26.2% ($p < 0.001$)
- 6MWD changed 2738 vs. 842 ($p < 0.001$)
- MLHFQ score reduced 14 vs. 2.9 ($p < 0.001$) in recurrence versus not
- Hospitalization rate substantially lower in ablation (31% vs. 57%, $p < 0.001$)
- All-cause mortality lower in ablation (8% vs. 18%, $p = 0.037$)

AATAC trial, Late breaking in ACC 15.

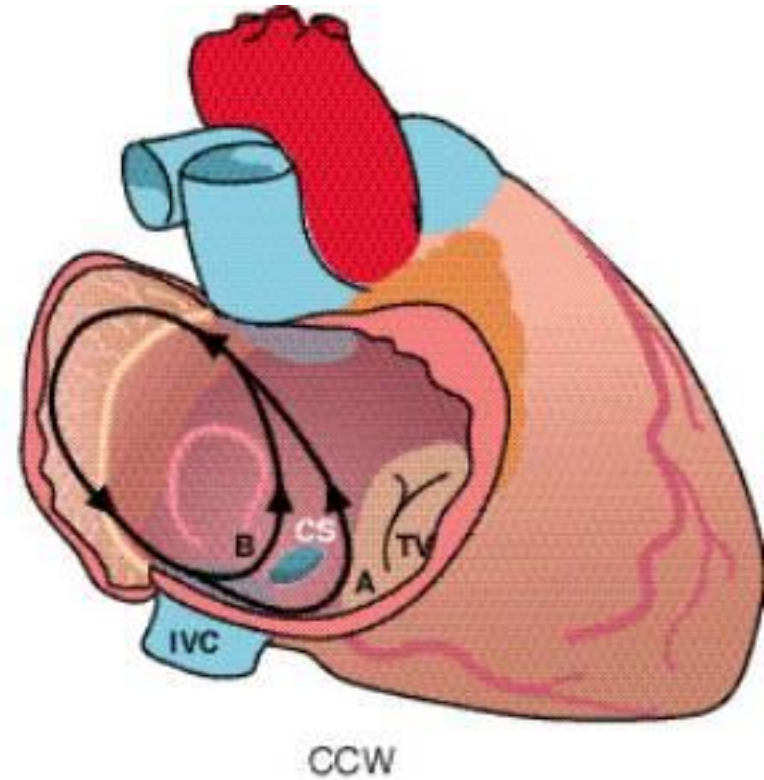
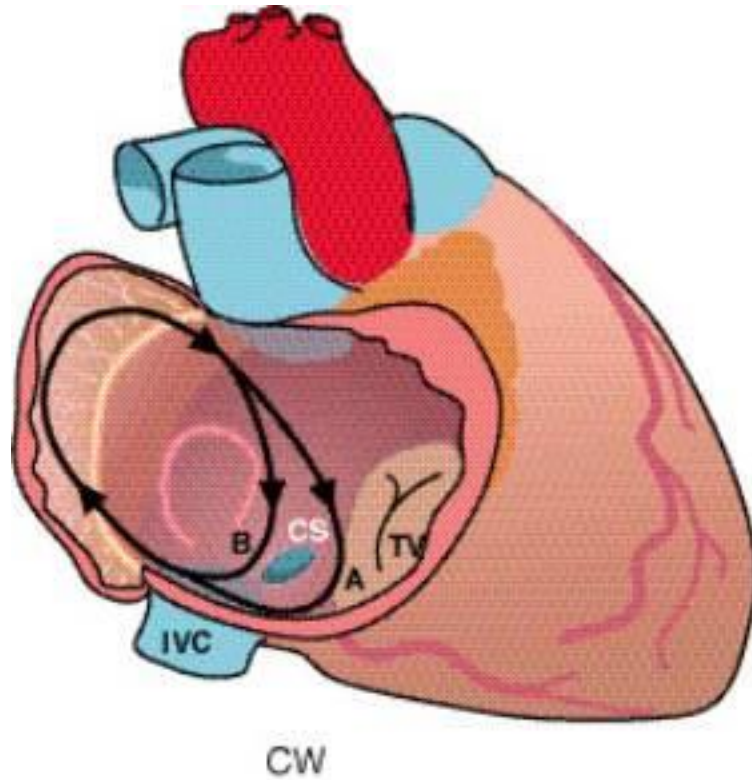
The risk of RFCA for AF

Type of Complication	No. of Patients	Rate, %
Death	25	0.15
Tamponade	213	1.31
Pneumothorax	15	0.09
Hemothorax	4	0.02
Sepsis, abscesses, or endocarditis	2	0.01
Permanent diaphragmatic paralysis	28	0.17
Total femoral pseudoaneurysm	152	0.93
Total artero-venous fistulae	88	0.54
Valve damage/requiring surgery	11/7	0.07
Atrium-esophageal fistulae	6	0.04
Stroke	37	0.23
Transient ischemic attack	115	0.71
PV stenoses requiring intervention	48	0.29
Total	741	4.54

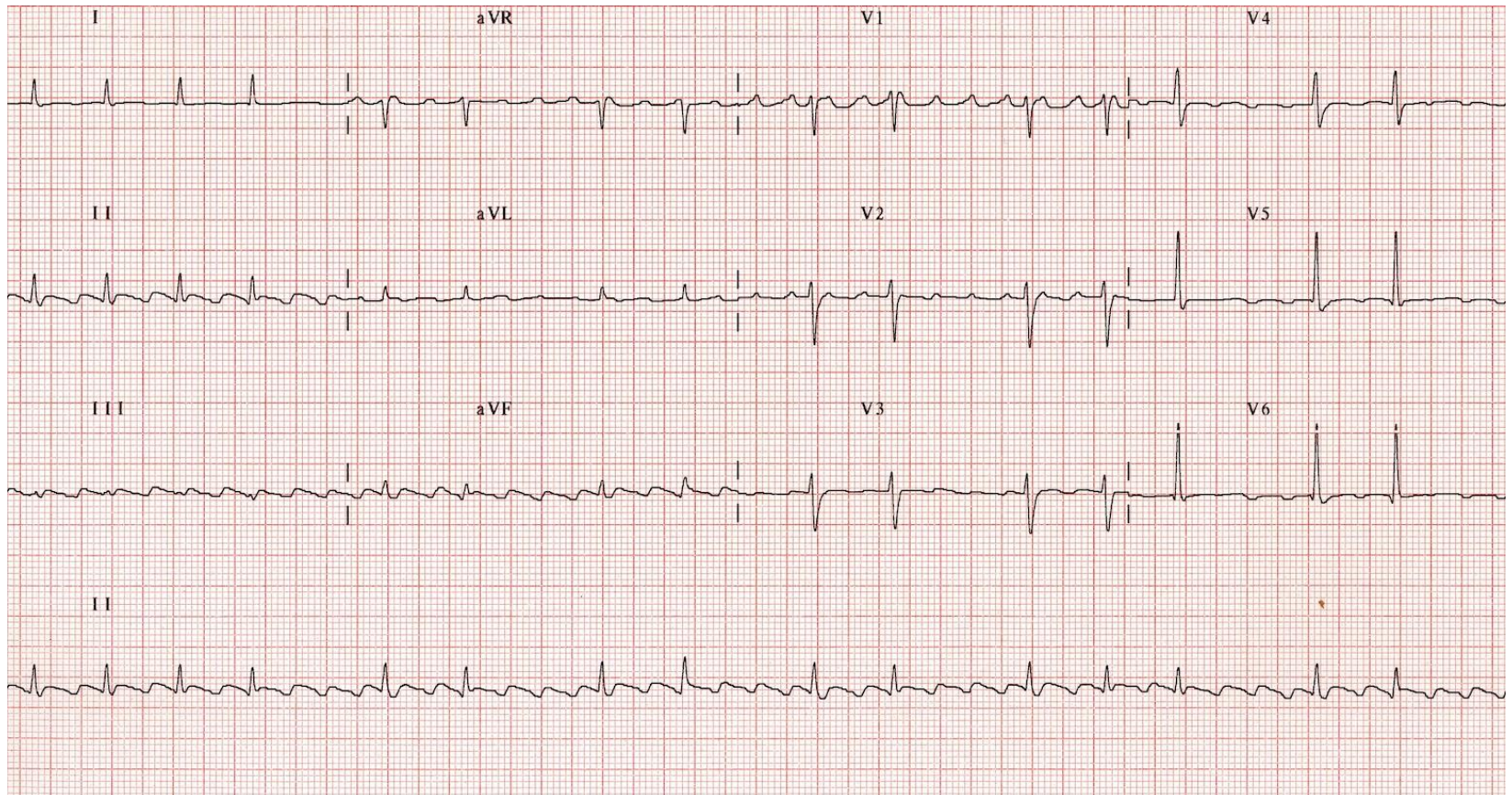
Cappato et al. Burkhardt al. *Circ Arrhythm Electrophysiol.* 2010

Significance of Typical Atrial Flutter

Macroreentry circuit of typical AFL



Typical AFL, **carvotricuspid isthmus-dependent AFL** (counterclockwise rotation)



AF & (Typical) AFL

	AF	(Typical) AFL
Similar	Stroke risk, decreasing cardiac output, commonly combined	
Mechanism	Automaticity/microreentry	Macroreentry
Regularity	Irregularly irregular	Sometimes, regular
Rate control	Relatively easy	Difficult (more symptomatic)
Recurrence after one ablation	30~50%	< 5% (unmasked AF 30%)
Procedure time	3~4 hr	< 1 hr
LA approach/3D mapping	+	-

Take hospital messages

- Heart has two pumps! atrium as well as ventricle.
- If it will be possible, rhythm control recover atrium and make better outcomes.
- Typical AFL is a good candidate for catheter ablation.