



Atrial fibrillation ablation in the Elderly patients



Prof. Fiorenzo Gaita

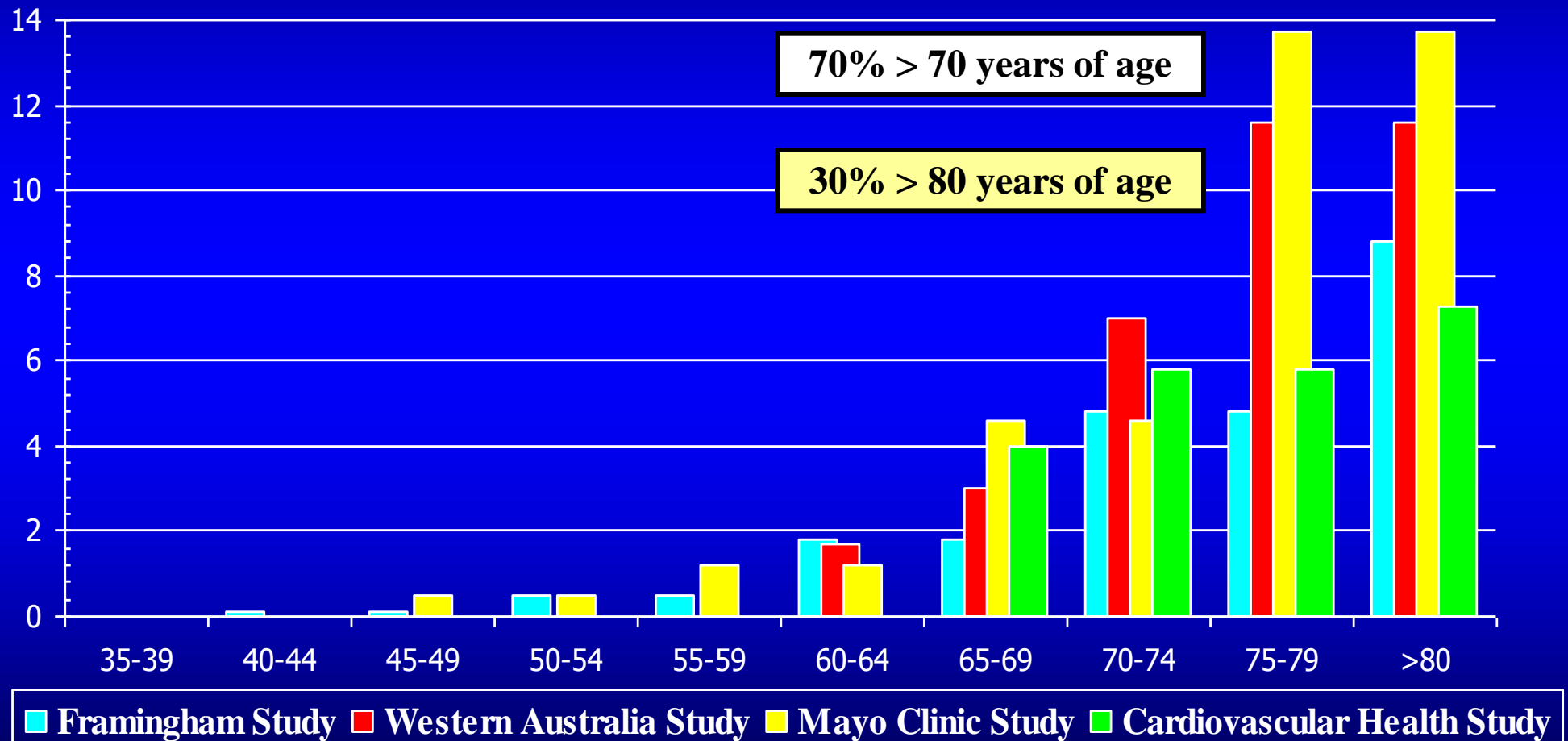
Division of Cardiology

Director of Cardiology School

San Giovanni Battista Hospital, University of Turin

Prevalence of AF in the general population

Prevalence and age distribution in patients with atrial fibrillation



Feinberg WM et al. Arch Intern Med 1995;155:469-473.

Electrophysiologic mechanisms of AF

Trigger

APC,
post-extrasystolic pause,
long-short cycle

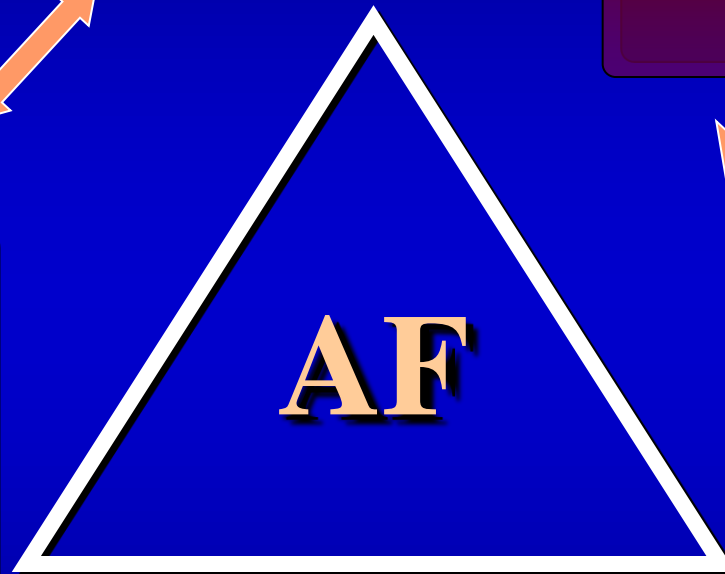
Substrate

Anatomical:

Atrial dilatation,
↑ deposition of collagen and
↑ fibrosis, Hypertrophy,
Loss of connecting protein

Electrophysiological:

Short ERP,
ERP dispersion,
lack of ERP rate adaptation
intraatrial conduction delay,
functional conduction block.



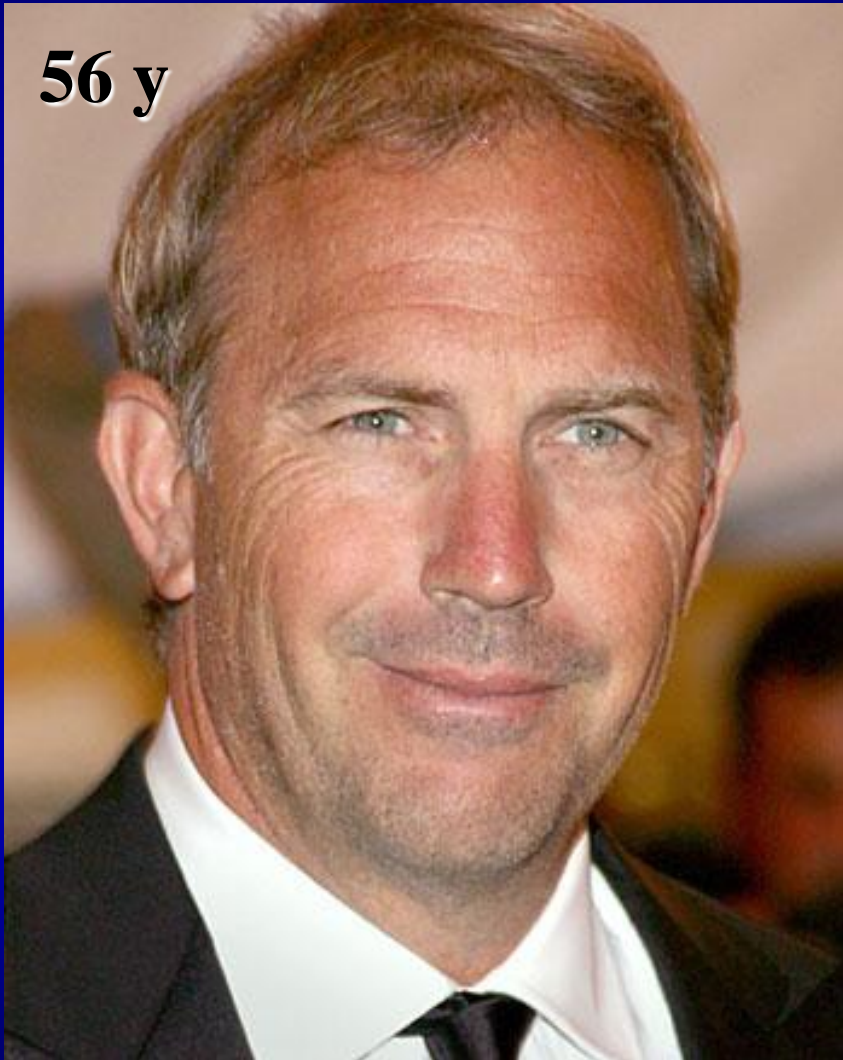
Triangolo di Coumel

**Autonomic
Nervous
System**

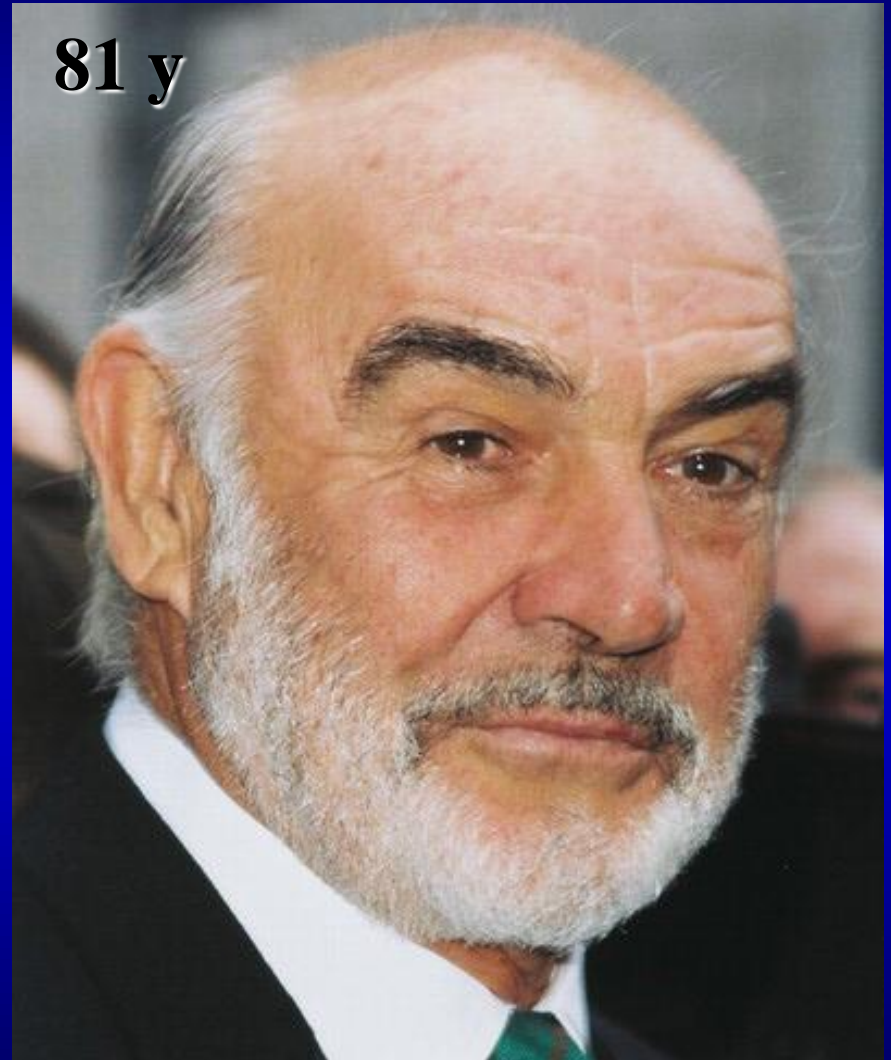
Vagal
Adrenergic

Atrial Fibrillation In The Elderly

56 y

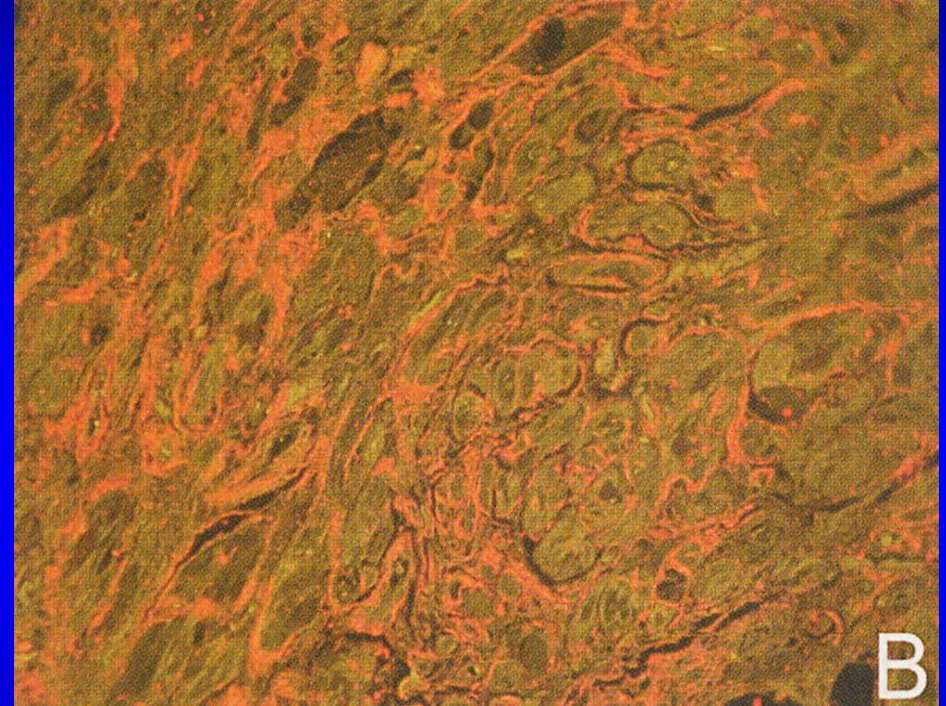
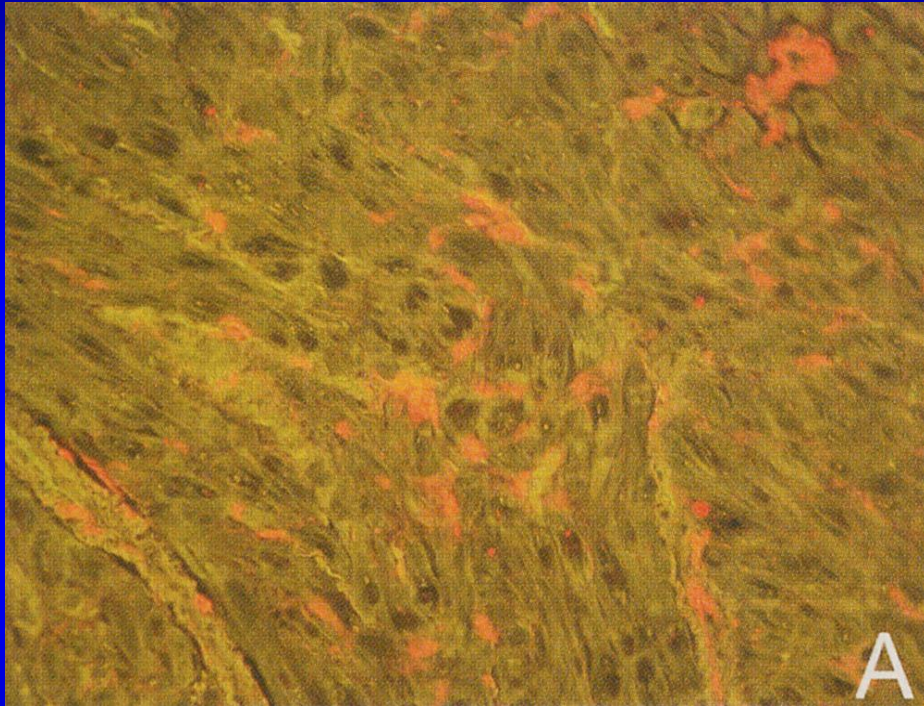


81 y



Are older patients different?

Atrial Fibrillation: Pathological Changes With Age



Congo red-stained paraffin sections from right atrial appendages showing atrial amyloid of different degrees as visualized by fluorescence microscopy. A- Minor amount of amyloid(0.5); B-major amount of amyloid (1.00). Original magnification 20.

Atrial Fibrillation In The Elderly

Are older patients different?

	Younger Patients	Elderly Patients
Associated Disease	+/-	+++

Associated to structural heart disease:

- **Valvular heart disease (mitral)** *
- **Coronary artery disease** *
- **Systemic hypertension** *
- **Hypertrophic cardiomyopathy**
- **Dilated cardiomyopathy** *
- **Congenital cardiomyopathy (septum)**
- **Cardiomyopathy restrictive**
- **Cardiac tumors**
- **Pericarditis**
- **Cor pulmonale** *

“Lone atrial fibrillation”

Atrial Fibrillation

Not associated to structural heart disease:

- **Sinus node dysfunction** *
- **WPW syndrome**
- **Brugada syndrome**
- **Short QT syndrome**

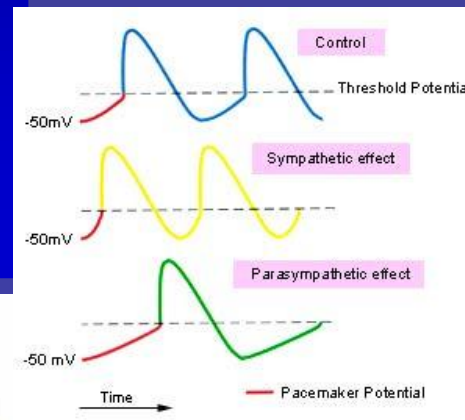
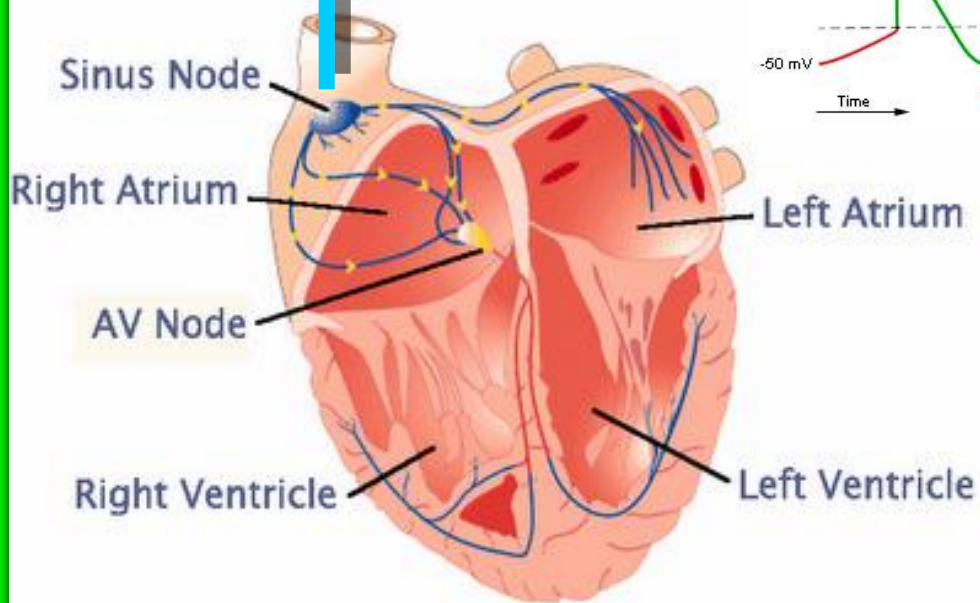
Associated to other conditions:

- **Hyperthyroidism**
- **Sleep apnoea syndrome** *
- **Emery-Dreyfus dystrophy**

Sinus Node activity

balance between intrinsic sinus function and extrinsic influence by ANS

Action potential



Intrinsic sinus function
(with block of autonomic influences)

$$118 - (0.57 \times \text{età}) \pm 18\%$$

$$50 \text{ y} = 89 \pm 16 \text{ bpm}$$

$$60 \text{ y} = 84 \pm 15 \text{ bpm}$$

$$70 \text{ y} = 78 \pm 14 \text{ bpm}$$

$$80 \text{ y} = 72 \pm 13 \text{ bpm}$$

IHR is progressively reduced with age
Adrenergic activity increases with age

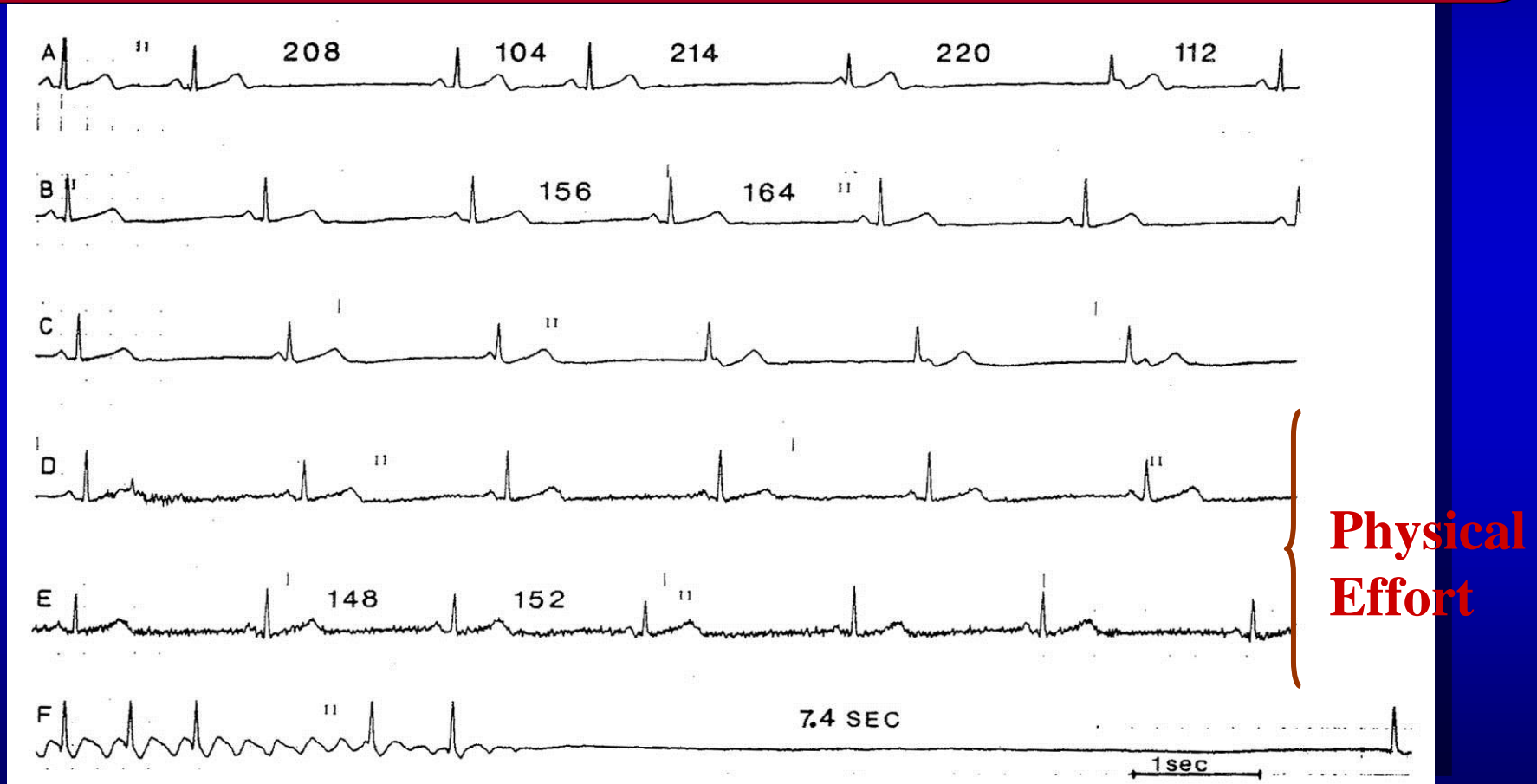
Sick Sinus Syndrome

ECG manifestations

- **Sinus Bradycardia** spontaneous persistent, or intermittent, not secondary to drugs or vagal influence
- **SA blocks and/or sinus pauses**
- **HR raise failure**
- **Brady-tachy syndrome** (atrial arrhythmia alternating to sinus bradycardia or pauses)

Sick Sinus Syndrome

Different clinical ECG presentations (alone or together in the same patient)



Atrial Fibrillation In The Elderly

Are older patients different?

Younger Patients

Elderly Patients

Associated Disease

+/-

+++



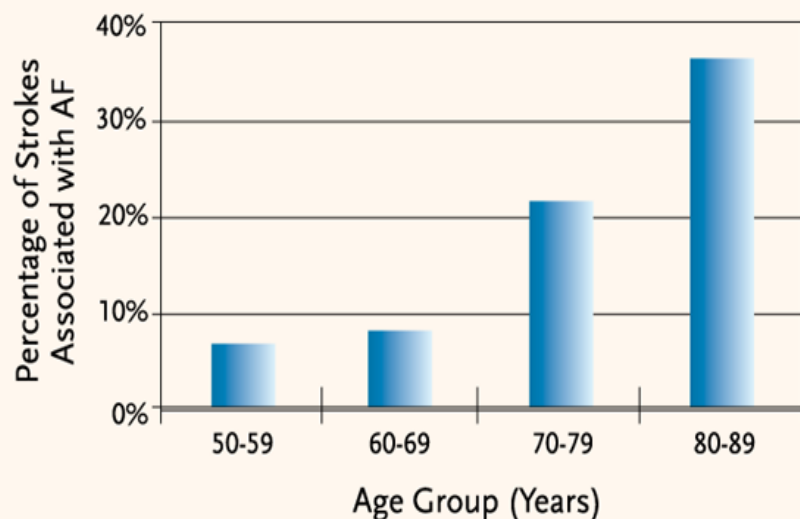
AF and the risk of STROKE

In AF pts exists an ↑ risk of stroke or thromboembolic complications

(5 times higher)

and this association increases with age.

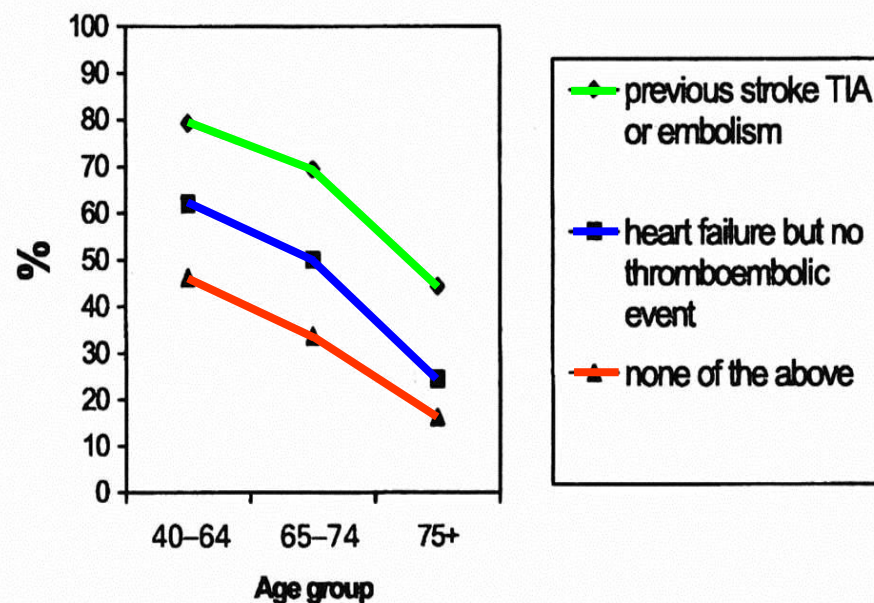
Percentage of Strokes Associated with Atrial Fibrillation



Wolf PA et al, *Arch Intern Med.* 1987; 147: 1561-1564

Anticoagulation Paradox

Proportion of patients prescribed warfarin



Proportion of patients prescribed warfarin by age and risk group.

Burton et al J CV Risk 2001 858 pts; no contraindications

Atrial Fibrillation In The Elderly

Are older patients different?

	Younger Patients	Elderly Patients
Associated Disease	+/-	+++
Symptoms	+++	+
Paroxysmal/Permanent	Paroxysmal	Permanent
Thromboembolic Risk	+	+++
Hemorrhagic Risk	+/-	++

Antiarrhythmic therapy is more difficult to manage

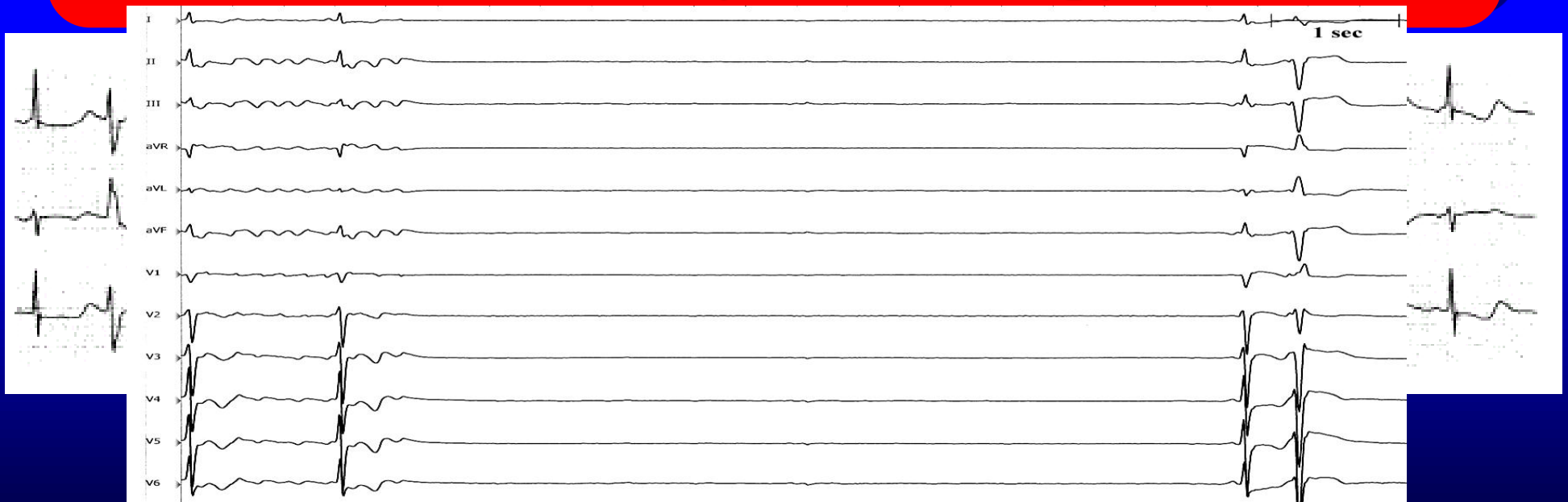
1- Altered liver and renal function

2- Electrolyte abnormalities

3- Poor compliance

Pathologic recovery time of sinus node

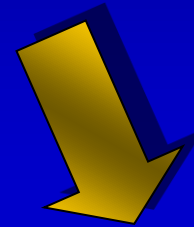
(increased by ADDs therapy)



AF therapy in the Elderly:



**RHYTHM CONTROL
STRATEGY**



**RATE CONTROL
THERAPY**

Atrial fibrillation

Rate control

Advantages

- **Simpler than rhythm control** (less hosp)
- **Easily achieved in all pts** (rarely some may need AV node ablation/PMP)
- **Avoids proarrhythmic effects** of antiarrhythmic drugs

AFFIRM: Total Mortality (at 5 years)

Rate control *vs* Rhythm control

Rate control therapy *vs* Rhythm control therapy

4060 pts,

Age 69.7±9 years

528 pts (13%) > 80 y

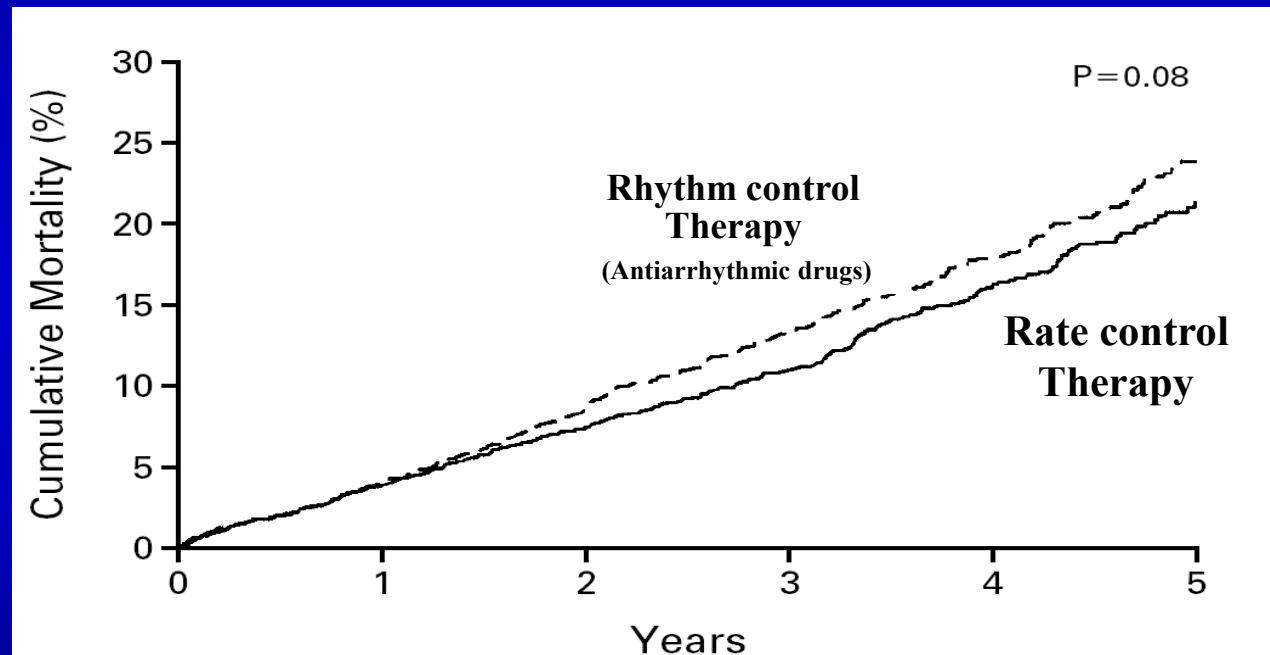
-70.8% Hypertension

-38.2% Ischemic

-↓ EF 26%

-↑ Left atrium 64,7%

Mean FU: 3,5 y



NO. OF DEATHS

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)

Atrial fibrillation

Rhythm control: Antiarrhythmic drugs/ECV

Potential benefits

- **Improved symptoms**
- **Improved CO/exercise tolerance**
- **Reduced embolic risk**

Disadvantages

- **Proarrhythmic effect**
- **False sense of security → OAC interruption
→ embolism**

AFFIRM:

“On treatment” analysis in a subgroup of 2796 pts

Covariates associated to survival:

Covariate	p	HR
Sinus Rhythm	<0.0001	0.53
Warfarin	<0.0001	0.50
Antiarrhythmic drugs	0.0005	1.49
Digoxin	0.0007	1.42

RS e Warfarin

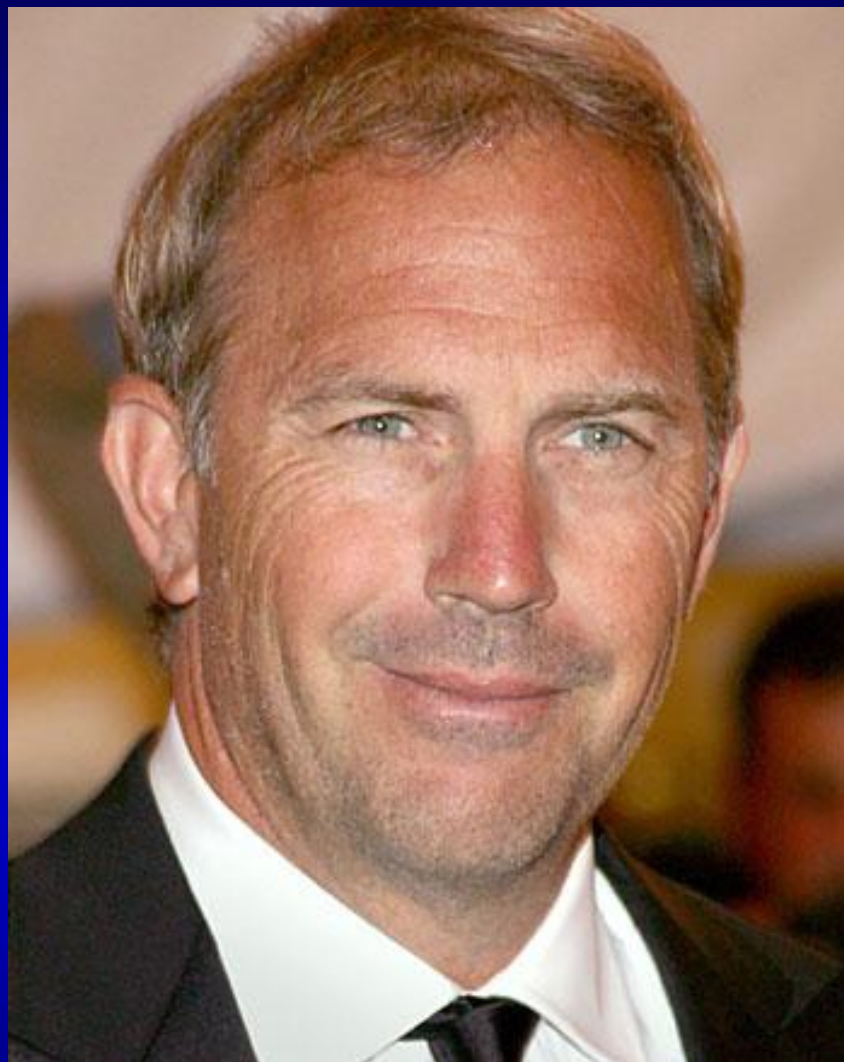
↓ of about 50%
risk of death

AADs and digoxin

↑ of about 50%
risk of death

**Sinus Rhythm is better
but antiarrhythmic therapy
is difficult to manage**

**...so Catheter Ablation may be a useful
therapeutic option**

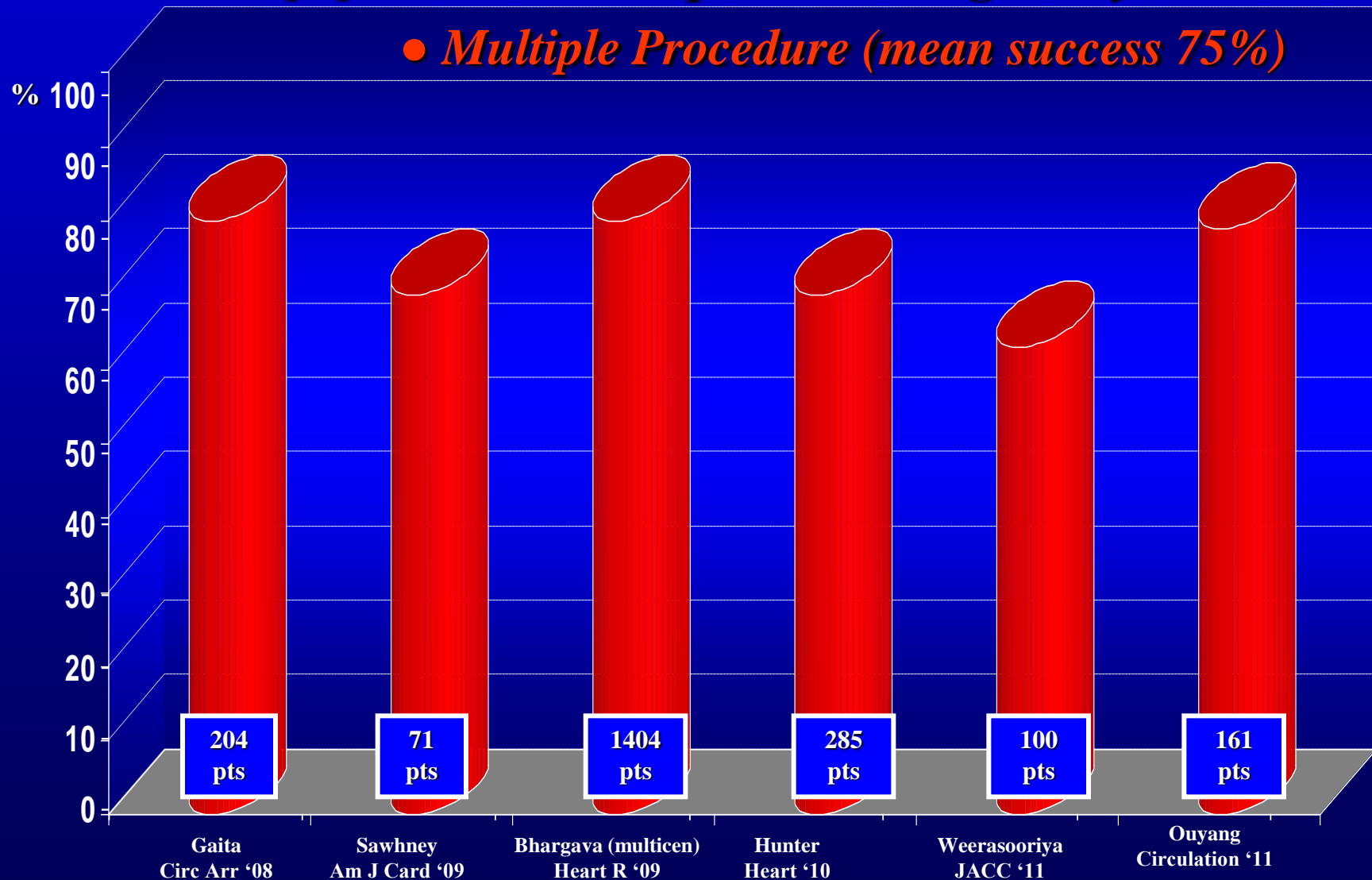


Efficacy and Safety in Middle age Patients

Long-term efficacy of AF Ablation (mean FU 3.5 y)

Total population: 2225 pts, mean age 59 y

● *Multiple Procedure (mean success 75%)*



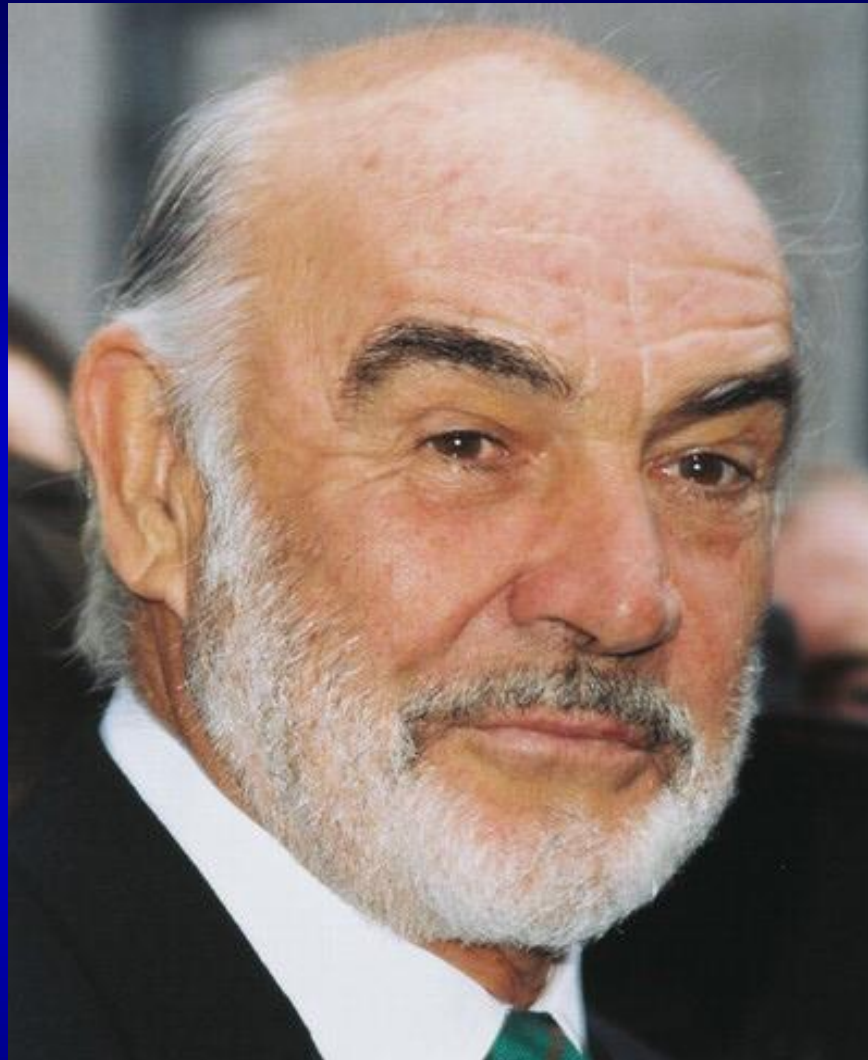
Symptomatic Complications in AF ablation

Tamponade 0.3-1.3%
Stroke/TIA 0.5-0.9%

1033 pts
Experienced center:

Complications	Pts	1.6%
Deaths	0	0
Stroke	1	0.1
TIA	4	0.4
Severe PV stenosis	3	0.3
Tamponade/Perf	5	0.5
Vascular complic	3	0.3

Verma Circulation 2005



Efficacy and Safety in the Elderly?

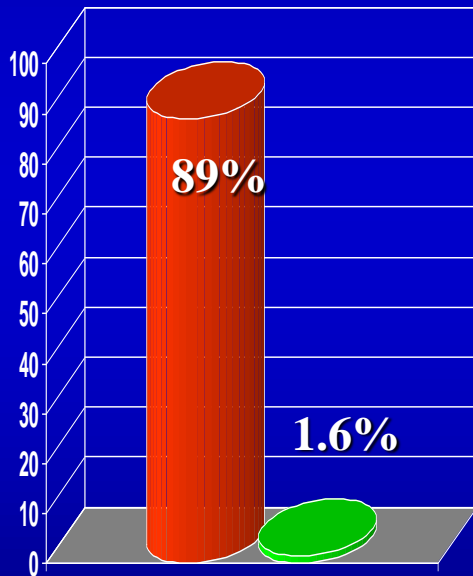
Long-Term Clinical Efficacy and Risk of Catheter Ablation for AF in the **Elderly**

FU 27 mos

32/1165 pts (2.7%) ≥ 75 y, 60% Paroxysmal AF

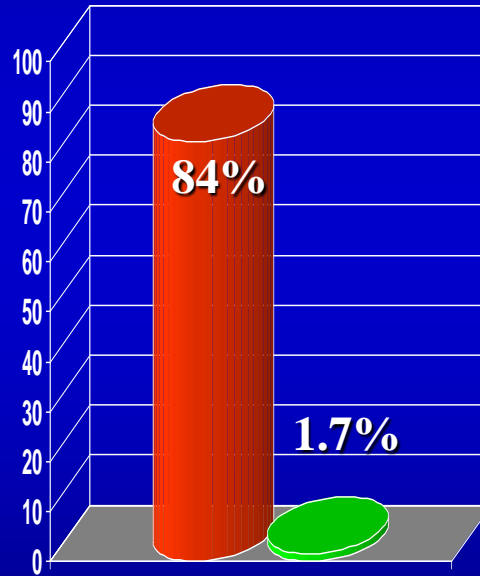
PVI or ablation of other AF triggers

Group 1: 948 pts (81.3%)



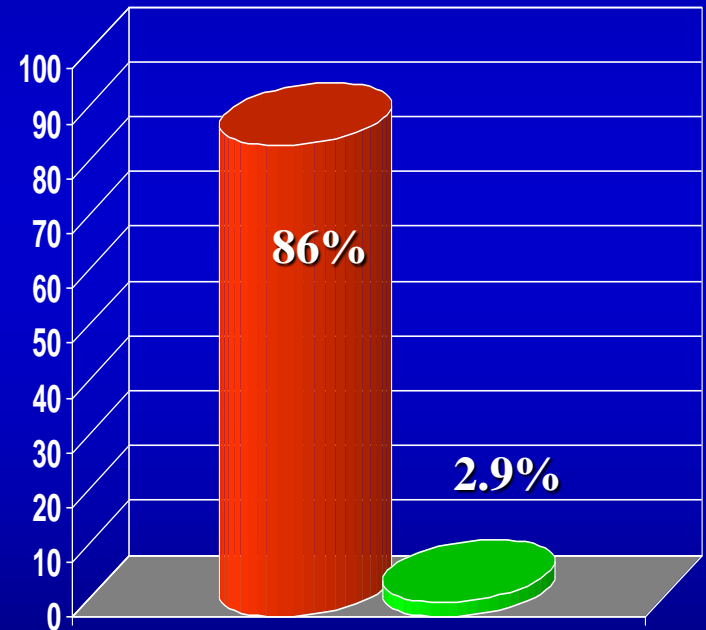
< 65 years

Group 2: 185 pts (16%)



65 - 74 years

Group 3: 32 pts (2.7%)



≥ 75 years

Success (%)

Complications (%)

Zado E. et al JCE 2008;19:621-626

Long-Term Clinical Efficacy and Risk of Catheter Ablation for AF in Octogenarians

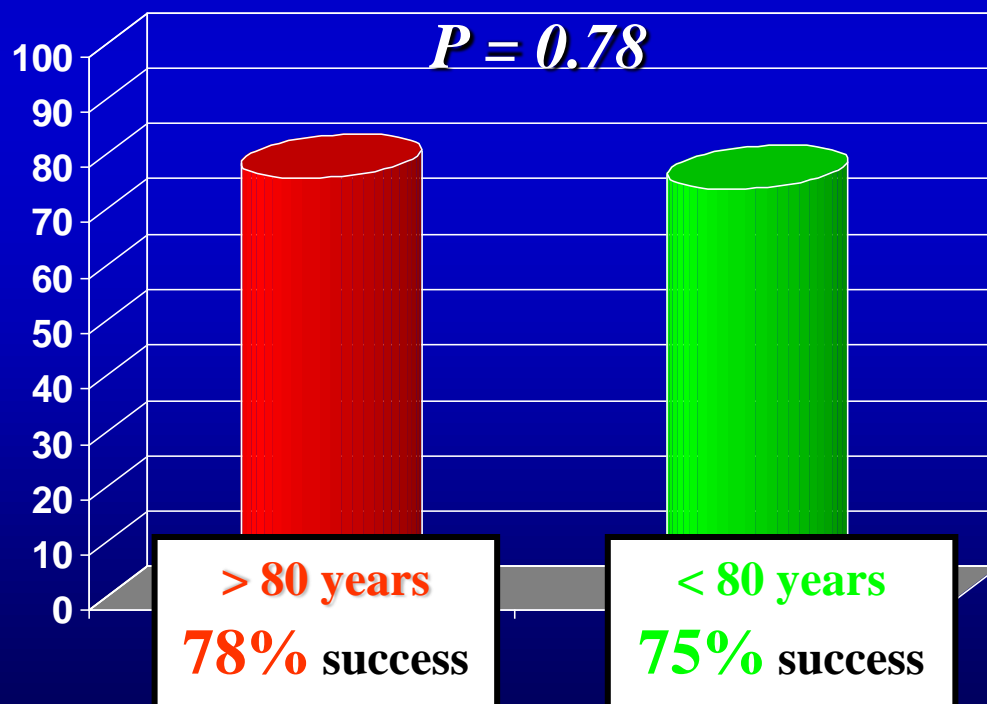
FU 1 year

752 Pts, Hp 55%, PAF 50%, structural Heart disease 45%

PVI ± Linear lesions

>80 years: 35 pts (4.7%)
mean age 82±2

< 80 years: 717 pts (95.3%)
mean age 64±10



*Off All AAD,
~ 25% II procedure*

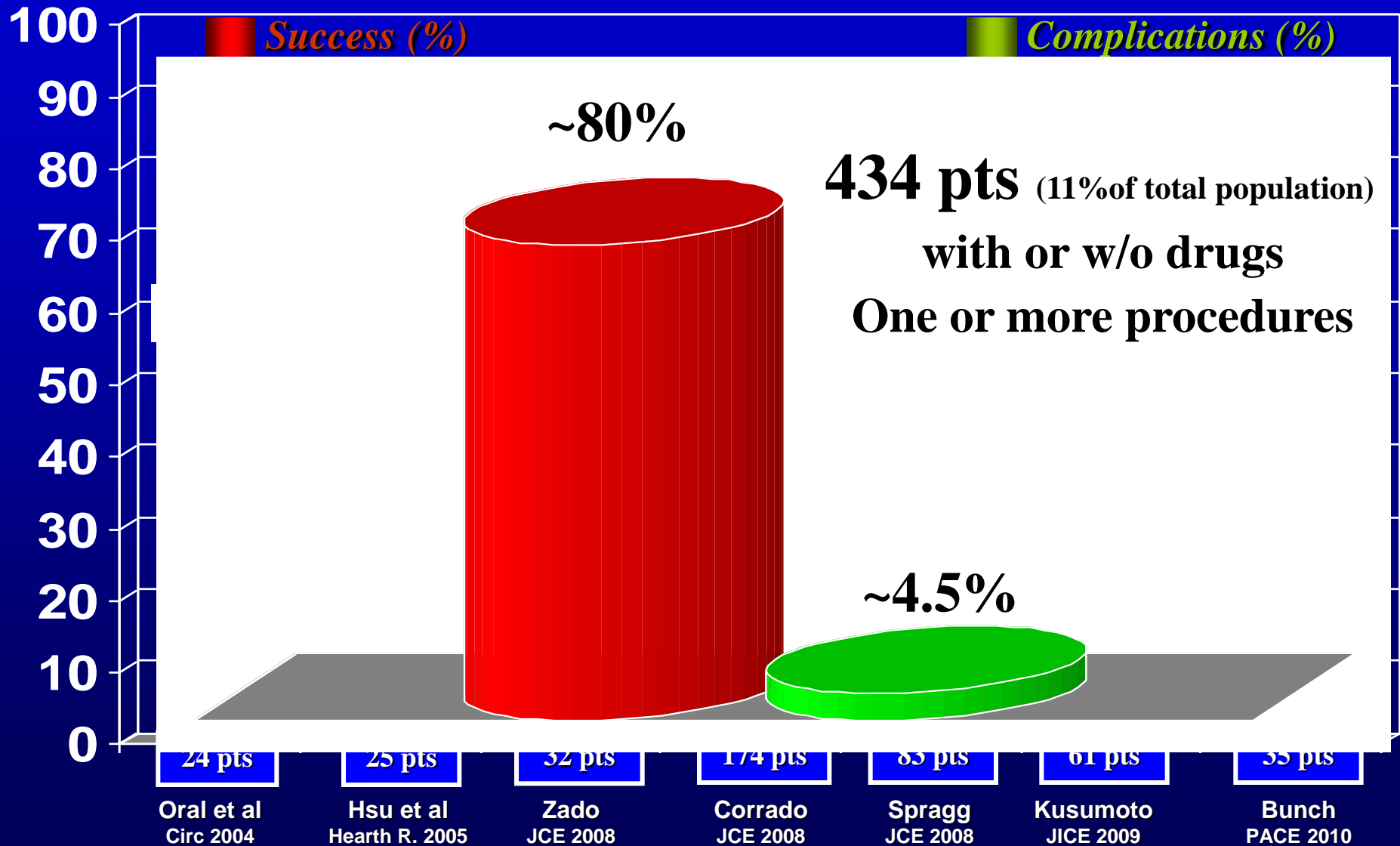
Long-Term Clinical Efficacy and Risk of Catheter Ablation for AF in Octogenarians

Adverse Events at 1 year after RF ablation for AF

Characteristic	<80 Years (N = 717)	≥80 Years (N = 35)	P-Value
Death	0.7 (5)	0.0 (0)	0.99
Myocardial infarction	0 (0)	0 (0)	—
Cerebrovascular event			
Stroke	0.6 (4)	0 (0)	0.99
Transient ischemic attack	0.3 (2)	0 (0)	0.99
Perforation with tamponade	1.3 (9)	2.8 (1)	0.08
Pulmonary vein stenosis	0.1 (1)	0 (0)	—
Deep venous thrombosis	0 (0)	2.8 (1)	0.05
Esophageal injury	0 (0)	0 (0)	—
Vascular injury	0.1 (1)	0 (0)	1.00
Phrenic nerve injury	0 (0)	0 (0)	—
Urinary tract infection	1.0 (7)	2.9 (1)	0.32

AF Ablation in the Elderly: Results from retrospective and small studies

Total population: **3935** pts; *age > 70 years: 434 pts (11%)*

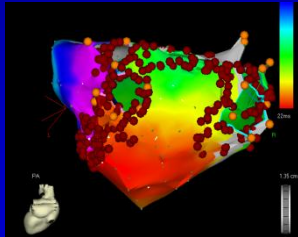


PV Isolation with multipolar catheter

2249 pts (mean age 59 y, **10% > 70 y**, 0.9% > 80 y) **F-up: 1 year**

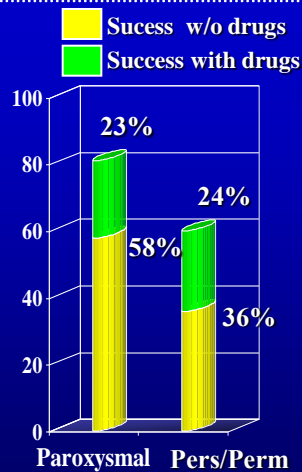
1996-2001

Pts 247



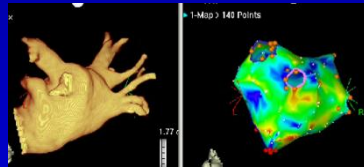
Proc. Durat.
4 h.

X-Ray:62'



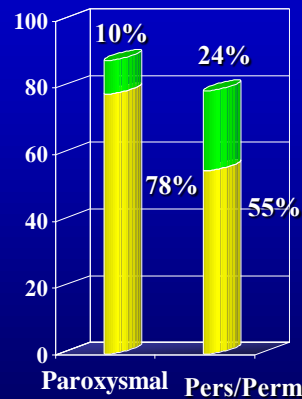
2002-2005

Pts 748



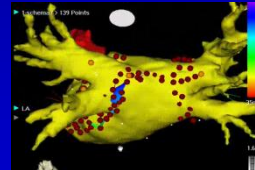
Proc. Durat
2,30 h.

X-Ray:44'



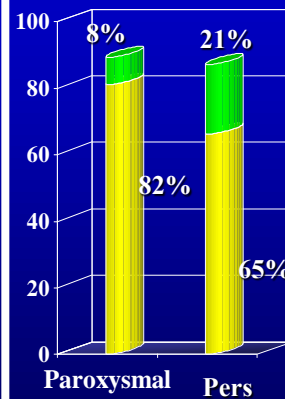
2006-07

Pts = 500



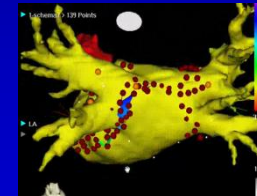
Proc. Durat.
2 h.

X-Ray:22'



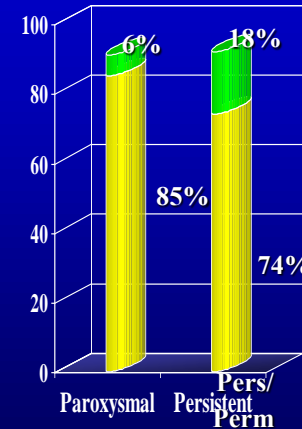
2008-09

Pts = 504



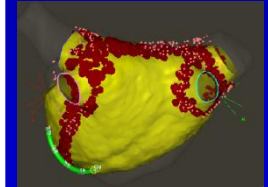
Dur. Proced.
2 h.

X-Ray:8'



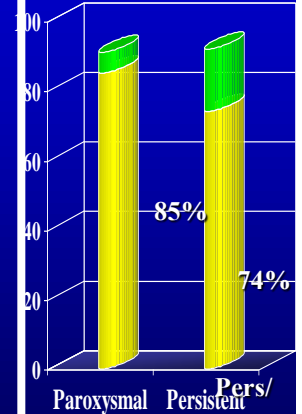
2010

Pts =250



Dur. Proced.
1.30 h.

X-Ray:6'

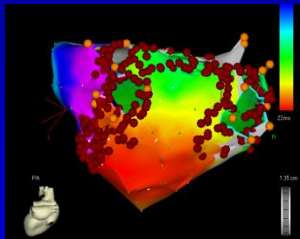


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2249 pts (mean age 59 y, 10% > 70 y, **0.9% > 80 y**) **F-up: 1 year**

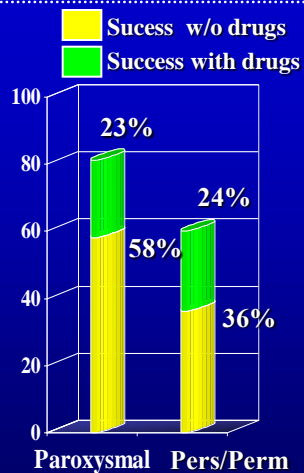
1996-2001

Pts 247



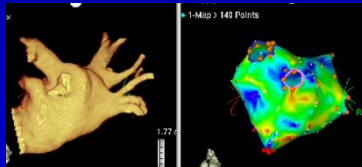
**Proc. Durat.
4 h.**

X-Ray:62'



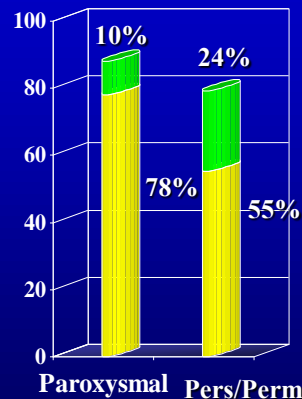
2002-2005

Pts 748



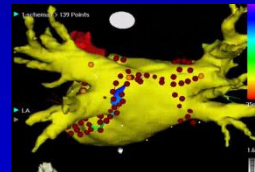
**Proc. Durat
2,30 h.**

X-Ray:44'



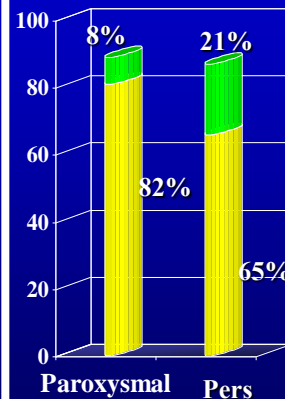
2006-07

Pts = 500



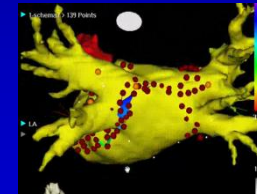
**Proc. Durat.
2 h.**

X-Ray:22'



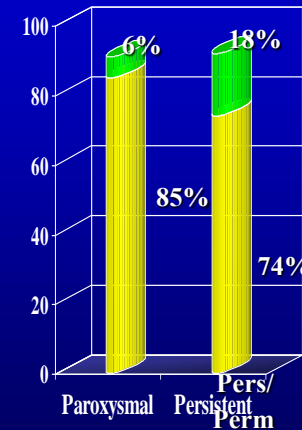
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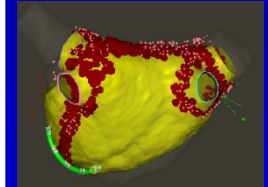
**Dur. Proced.
2 h.**

X-Ray:8'



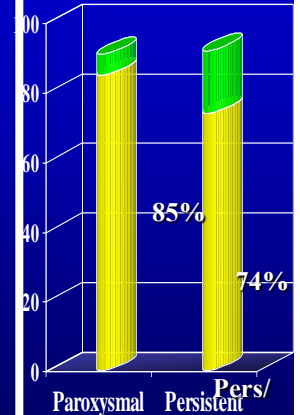
2010

Pts =250



**Dur. Proced.
1.30 h.**

X-Ray:6'



8.000.000 pts with AF
all around the world

treated with **ablation** in the world
200.000 pts (2.5%)

Out of **200.000** pts,
only 10% (**20.000**) are > 70 y

5.600.000 are
> 70 years old

20.000/5.600.00 (**0.4%**)
AF Elderly pts
are treated with ablation

Atrial Fibrillation in the elderly

Conclusions

Ablation is an effective and safety therapeutic option also in the Elderly

The limited use of AF ablation in elderly (0.4% in the total world population) is not supported by clinical data (inefficacy or increased complications), but is related to limited resources and current physician belief