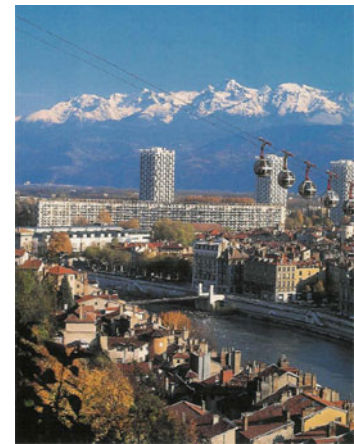




Fibrillation Auriculaire du sportif : Techniques ablatives

15 Septembre 2012

Pascal Defaye, CHU Grenoble



FA du sportif : techniques ablatives

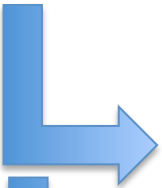
Introduction

- ❑ Le sport : symbole de qualité de vie
- ❑ Les athlètes : des héros depuis Olympie...

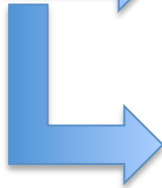


2x plus de risque de FA

- ❑ Pourquoi la FA chez le sportif :
 - Adaptation structurelle du cœur : hypertrophie, dilatation, fibrose
 - Altérations fonctionnelles : canaux cellulaires
 - Augmentation du frein vagal



**Modifications de propriétés électrophysiologiques de l'OG,
Réentrées favorisées, « stretch », activité focale**



Rôle des veines pulmonaires probablement identique/population contrôle

L'ablation est-elle adaptée à la FA du sportif?
Quels résultats?
Quelle méthode?

Radiofrequency Catheter Ablation of Atrial Fibrillation in Athletes Referred for Disabling Symptoms Preventing Usual Training Schedule and Sport Competition

FRANCESCO FURLANELLO, M.D.,* PIERPAOLO LUPO, M.D.,* MARIO PITTALIS, M.D.,*
SARA FORESTI, M.D.,* LAURA VITALI-SERDOZ, M.D.,* PIETRO FRANCA, M.D.,*
GUIDO DE AMBROGGI, M.D.,* PAOLO FERRERO, M.D.,* STEFANO NARDI, M.D.,†
GIUSEPPE INAMA, M.D.,§ LUIGI DE AMBROGGI, M.D.,*,† and RICCARDO CAPPATO, M.D.*

□ 20 athlètes :

- jeune ou adulte, amateur ou professionnel,
- sport : depuis 25,2±13 ans
 - ski : 4;
 - football: 5;
 - course à pied type marathon : 5;
 - cyclisme : 6
- **≥ 20 H de sport/semaine**
- 7 : « sport elite athletes »

□ Hommes : tous

□ FA paroxystique : 14 pts

□ FA persistante : 6 patients

□ FA induite par ECG d'effort : 13 pts (65%)

Réduction capacité maximale d'effort : 176±21 W vs 207±43 W (p<0,05) si pas de FA à l'effort

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❑ Procédure :

- Ablation flutter associé : 7 pts
- Contrôle ablation chez tous les patients $\pm 2^{\text{ème}}$ ablation
 - 1 pt : 1 procédure
 - 13 pts : 2 procédures
 - 6 patients : 3 procédures

❑ Résultats :

- 18 (90%) de patients **asymptomatiques** sans FA documentée après le protocole d'ablation
- 2 (10%) pts : quelques épisodes de quelques mn de palpitations
suivi : 36,1 $\pm$ 12,7 mois

❑ Post ablation :

- Augmentation des capacités d'effort : de 183 $\pm$ 32 à 218 $\pm$ 20 W ($p < 0,02$)
- Amélioration de tous les critères de qualité de vie ($p < 0,05$)
- Tous les athlètes ont repris le sport

Efficacy of circumferential pulmonary vein ablation of atrial fibrillation in endurance athletes

Naiara Calvo[†], Lluís Mont^{*†}, David Tamborero, Antonio Berruezo, Graziana Viola, Eduard Guasch, Mercè Nadal, David Andreu, Barbara Vidal, Marta Sitges, and Josep Brugada

❑ Sport d'endurance : >3H de sport /semaine
haute intensité
depuis au moins 10 ans

Table 1 Clinical and echocardiographic parameters at baseline

Baseline characteristics of patients	n = 182
Age (years)	51 ± 11
Male gender	148 (81%)
Hypertension	59 (32%)
Type of AF	
Paroxysmal	120 (66%)
Persistent	39 (21%)
Long-standing	23 (13%)
Structural heart disease	32 (18%)
Lone AF	107 (59%)
Endurance athletes ^a	64 (35%)
Lone AF sport group ^b	42 (23%)
AF origin	
Vagal	64 (35%)
Adrenergic	5 (3%)
Unknown	113 (62%)
AF duration (years)	6.1 ± 5.0
Echocardiography	
LAD (mm)	41.0 ± 5.9
LVEDD (mm)	51.4 ± 5.2
LVESD (mm)	32.9 ± 5.8
LVEF (%)	60.7 ± 10.3

Data are expressed as mean ± SD or number (%) of patients. AF, atrial fibrillation; LAD, anteroposterior left atrial diameter; LVEDD, left ventricular end-diastolic diameter; LVESD, left ventricular end-systolic diameter; LVEF, left ventricular ejection fraction.

^a>3 h/week >10 years when arrhythmia was diagnosed (with or without any other risk factors for AF).

^b>3 h/week >10 years when arrhythmia was diagnosed and without any other risk factors for AF (i.e. athletes with lone AF).

Table 2 Clinical and echocardiographic characteristics of control group, lone AF sport group, and patients with lone AF and no history of endurance sport practice

	Control group	Athletes (lone AF sport group)	Lone AF	P-value ^a	P-value ^b
LAD (mm)	41.0 ± 6.2	41.1 ± 4.4	39 ± 6	0.883	0.174
LVEDD (mm)	51.7 ± 5.3	50.0 ± 4.3	51 ± 4.46	0.233	0.288
LVESD (mm)	33.5 ± 6.0	30.4 ± 4.7	32.5 ± 4.37	0.027	0.060
LVEF (%)	60.1 ± 10.6	62.9 ± 8.9	61.7 ± 8.5	0.152	0.610
Age (years)	52.1 ± 10.8	48.5 ± 11.0	47.3 ± 10.5	0.057	0.585
Paroxysmal AF	90 (64%)	31 (74%)	48 (74%)	0.251	0.603
Vagal AF	48 (34%)	16 (38%)	19 (36%)	0.650	0.545
Hypertension	60 (43%)	0 (0%)	0 (0%)	<0.001	
Male gender	111 (79%)	39 (93%)	50 (77%)	0.0427	0.031
Structural heart disease	32 (23%)	0 (0%)	0 (0%)	<0.001	

AF, atrial fibrillation; LAD, left atrial anteroposterior diameter; LVEDD, left ventricle end-diastolic diameter; LVESD, left ventricle end-systolic diameter; LVEF, left ventricle ejection fraction.

^aP-value: control group vs. lone AF sport group.

^bP-value: lone AF sport group vs. lone AF (without history of sport practice) group.

Efficacy of circumferential pulmonary vein ablation of atrial fibrillation in endurance athletes

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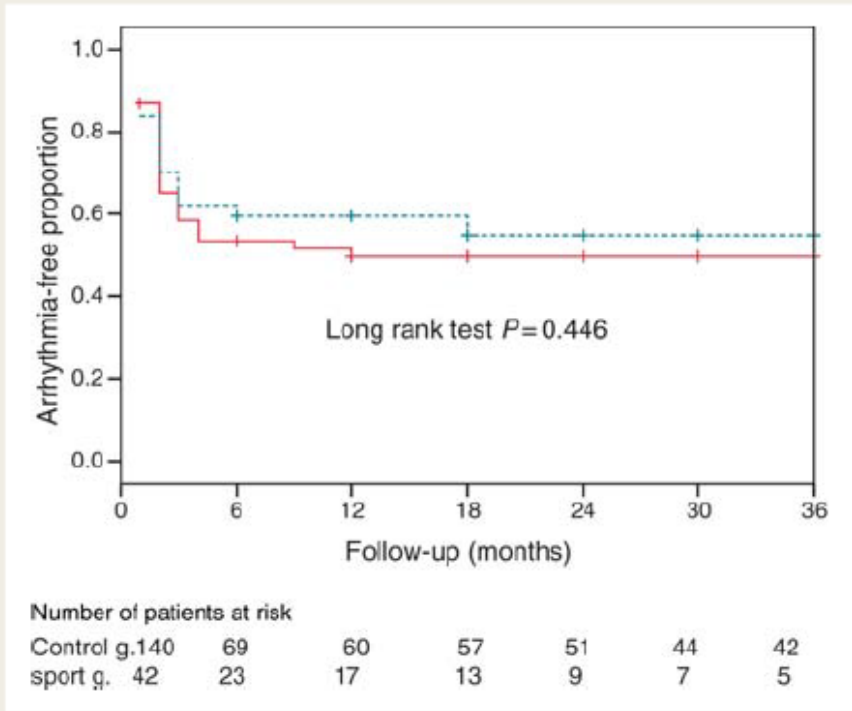


Figure 1 Kaplan–Meier curves for long-term freedom from recurrent arrhythmias after a single ablation procedure in the lone AF sport group (dashed line) and the control group (solid line).

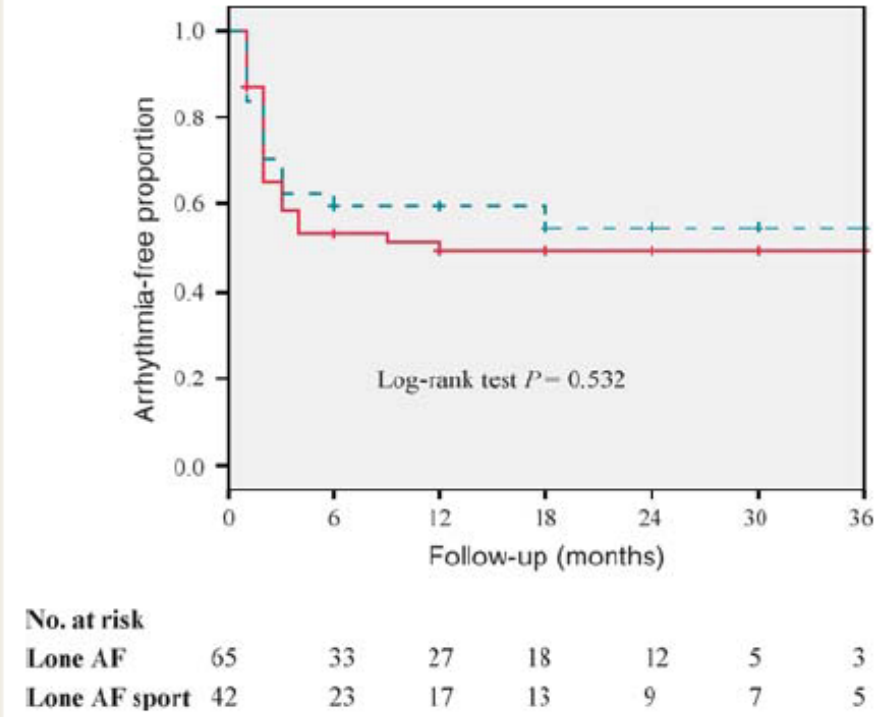
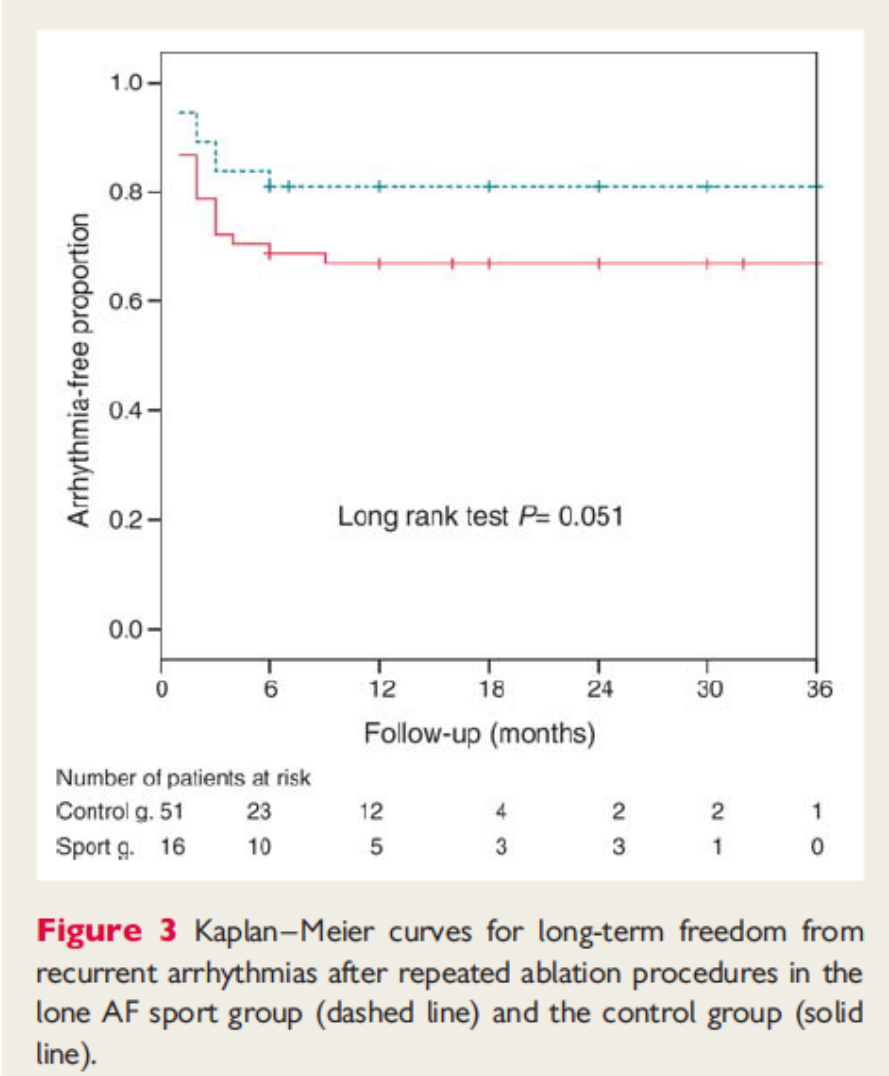


Figure 2 Kaplan–Meier curves for long-term freedom from recurrent arrhythmias after a single ablation procedure in the lone AF sport group (dashed line) and patients with lone AF and no history of exercise activity (solid line).

Efficacy of circumferential pulmonary vein ablation of atrial fibrillation in endurance athletes

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Table 3 Relationship between each baseline variable and arrhythmia recurrence after a single ablation procedure

	Hazard ratio (95% CI)	P-value
Age (years)	1.004 (0.983–1.025)	0.742
Male gender	1.048 (0.598–1.838)	0.869
Hypertension	1.181 (0.743–1.877)	0.482
Paroxysmal AF	0.535 (0.344–0.831)	0.005
Structural heart disease	0.931 (0.501–1.729)	0.821
AF duration (months)	1.00 (0.997–1.003)	0.940
LAD (mm)	1.057 (1.013–1.104)	0.011
LVEDD (mm)	1.014 (0.962–1.069)	0.609
LVESD (mm)	1.036 (0.997–1.077)	0.070
LVEF (%)	0.974 (0.953–0.996)	0.020
Sport practice	0.821 (0.475–1.419)	0.479

AF, atrial fibrillation; LAD, left atrial anteroposterior diameter; LVEDD, left ventricle end-diastolic diameter; LVESD, left ventricle end-systolic diameter; LVEF, left ventricle ejection fraction.

Table 4 Final model of the Cox regression for arrhythmia recurrence after a single ablation procedure

	Hazard ratio (95% CI)	P-value
AF		
Paroxysmal	1 (—)	—
Persistent	1.819 (0.990–3.340)	0.054
Long-standing	2.297 (1.090–4.839)	0.029
LAD (mm)	1.069 (1.018–1.122)	0.007

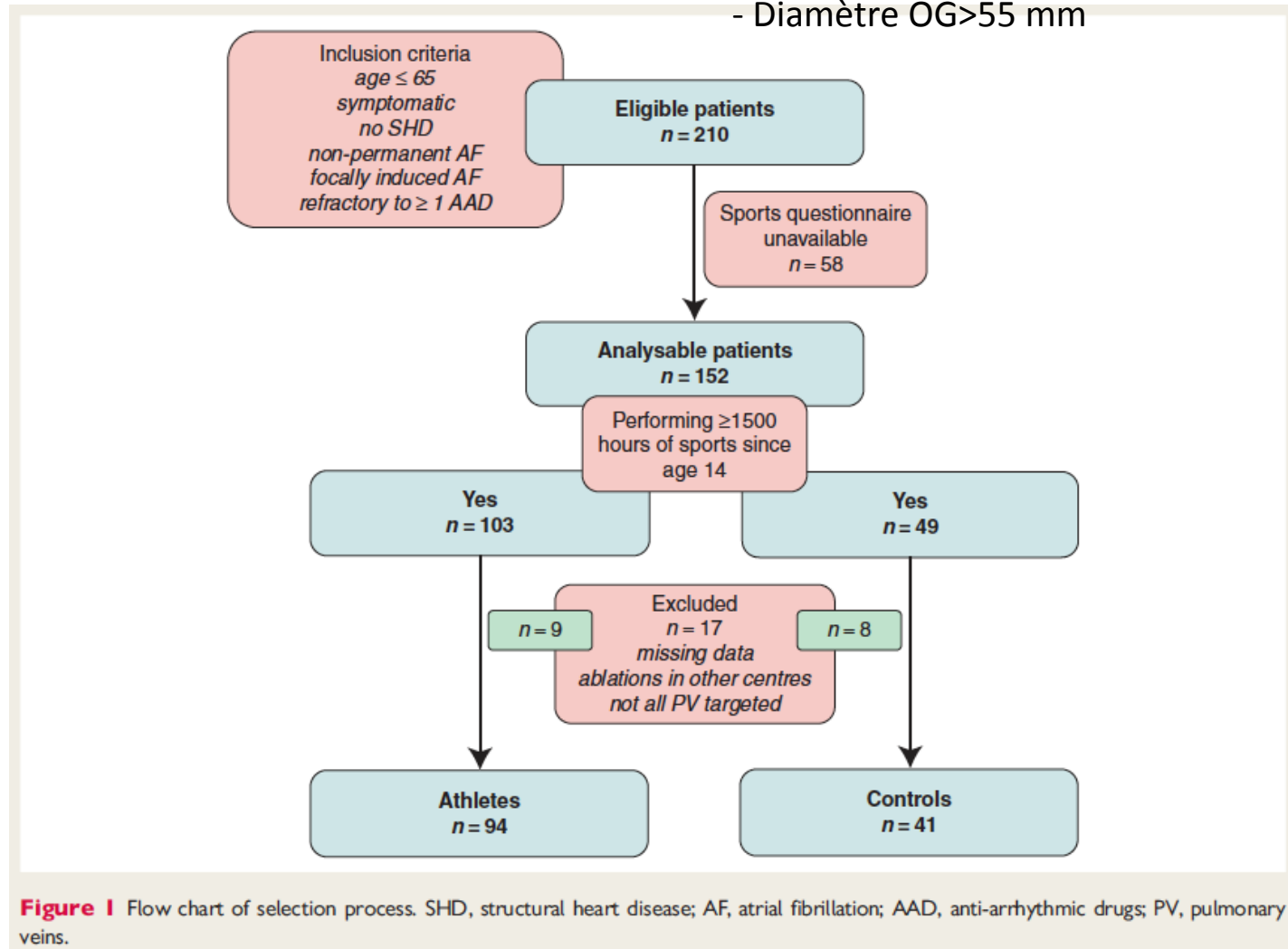
Efficacy of radiofrequency catheter ablation in athletes with atrial fibrillation

Pieter Koopman, Dieter Nuyens, Christophe Garweg, Andre La Gerche,
Stijn De Buck, Lieve Van Casteren, Becker Alzand, Rik Willems,
and Hein Heidbuchel*

*>3H de sport/ semaine pendant 10 ans
ou >1500 H durant la vie*

Exclusion :

- » Long standing persistant » et permanente
- Diamètre OG > 55 mm



Efficacy of radiofrequency catheter ablation in athletes with atrial fibrillation

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Table 1 Clinical and echocardiographic baseline characteristics

	Controls n = 41	All athletes n = 94	P value ^a	Endurance athletes n = 59	Non-endurance athletes n = 35	P value ^b
Age (years)	52 ± 8	51 ± 8	0.27	51 ± 8	50 ± 7	0.37
Male gender	27 (65.9%)	88 (93.6%)	<0.001	58 (98.3%)	30 (85.7%)	<0.001
AF type			0.23			0.37
Paroxysmal	39 (95.1%)	82 (87.2%)		51 (86.4%)	31 (88.6%)	
Persistent	2 (4.9%)	12 (12.8%)		8 (13.6%)	4 (11.4%)	
AF duration (years)	2 (2–4.5)	4 (2–9)	0.09	4 (2–10)	4 (2–8)	0.21
Echocardiography						
LAD (mm)	38 ± 7	40 ± 8	0.22	40 ± 7	40 ± 10	0.54
LVEDD (mm)	48 ± 5	50 ± 5	0.07	50 ± 5	50 ± 5	0.19
LVEF (%)	63 ± 7	64 ± 7	0.28	64 ± 8	64 ± 7	0.63
AHT	12 (29.3%)	22 (23.4%)	0.52	12 (20.3%)	10 (28.6%)	0.52
Lone AF	24 (58.5%)	59 (62.8%)	0.70	40 (67.8%)	19 (54.3%)	0.27
Sports practice						
Lifetime (hours)	450 (280–600)	8638 (4175–13688)	<0.001	10 550 (8375–16 225)	3450 (2600–5175)	<0.001
Since 14 years of age (hours/week)	0.2 (0.1–0.3)	4.4 (2.3–8.0)	<0.001	5.8 (4.1–8.6)	1.8 (1.4–2.8)	<0.001
After first ablation (hours/week)	0 (0–1)	3 (1–5)	<0.001	4 (2–7)	2 (0–3)	<0.001
PVI						
Ipsilateral	33 (80.5%)	74 (78.7%)	1.00	49 (83.1%)	25 (71.4%)	0.40
Additional lines	8 (19.5%)	17 (18.1%)	0.82	10 (16.9%)	7 (20.0%)	0.92
Follow-up (months)	40 (26–62)	41 (28–57)	0.92	41 (24–54)	42 (25–82)	0.85

AF, atrial fibrillation; LAD, left atrial diameter; LVEDD, left ventricular end-diastolic diameter; LVEF, left ventricular ejection fraction; AHT, arterial hypertension; and PVI, pulmonary vein isolation.

Data are expressed as mean ± standard deviation, median and interquartile range (IR), percentage (%), and number of patients

^aP value: athletes vs. controls

^bP value: endurance athletes vs. non-endurance athletes vs. controls

Efficacy of radiofrequency catheter ablation in athletes with atrial fibrillation

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Table 2 Arrhythmia recurrence evaluated at 3 years after first ablation and final outcome evaluated at 3 years after multiple ablations

	Controls	All athletes	P value ^a	Endurance athletes	Non-endurance athletes	P value ^b
Recurrence of arrhythmia at 3 years after first ablation						
All recurrence (%)	51.9	58.3	0.90	53.9	66.3	0.04
Freedom from AF (%)	48.1	41.7	0.90	46.1	33.7	0.04
Documented recurrence (%)	38.7	44.6	1.00	36.7	58.5	0.01
Time to recurrence (months)	2 (0–6)	3 (0–12)	0.52	5 (1–15)	1 (0–9)	0.16
Final outcome at 3 years after multiple ablations						
All recurrence (%)	12.7	15.5	0.61	15.7	15.2	0.88
Freedom from AF (%)	87.3	84.5	0.61	84.3	84.8	0.88
Number of procedures	1.2 ± 0.5	1.2 ± 0.4	0.62	1.1 ± 0.3	1.3 ± 0.5	0.07
Residual medication after multiple ablations (%)	65.9	62.8	0.85	55.9	74.3	0.19
Beta-blockade (%)	53.7	58.9	0.71	39	65.7	0.04
Calciumblockade (%)	17.1	20.2	0.81	18.6	22.9	0.81
Class I or III AAD (%)	24.4	36.2	0.23	30.5	45.7	0.13

AF, atrial fibrillation; and AAD, anti-arrhythmic drugs.

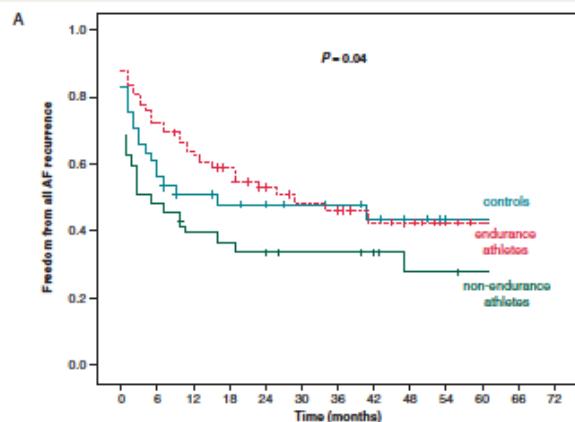
Data are expressed as mean ± standard deviation, median and interquartile range (IR), number of patients and percentage (%)

^aP value: athletes vs. controls

^bP value: endurance athletes vs. non-endurance athletes vs. controls

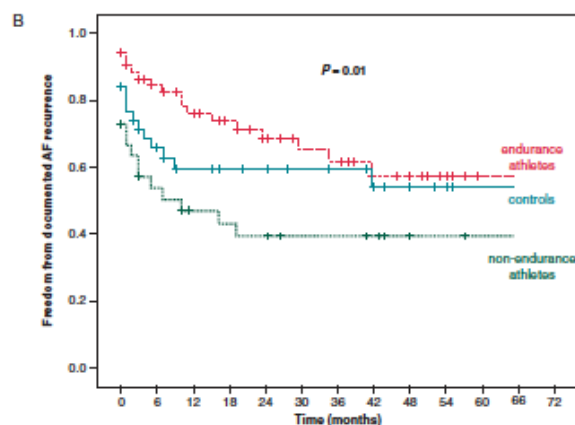
Efficacy of radiofrequency catheter ablation in athletes with atrial fibrillation

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Number of patients at risk

	0	6	12	18	24	30	36	42	48	54	60	66	72
controls	41	18	15	12	7	4							
endurance	59	37	25	19	11	4							
non-endurance	35	13	11	9	5	4							



Number of patients at risk

	0	6	12	18	24	30	36	42	48	54	60	66	72
controls	41	18	15	13	7	4							
endurance	59	37	25	20	11	4							
non-endurance	35	13	11	9	6	4							

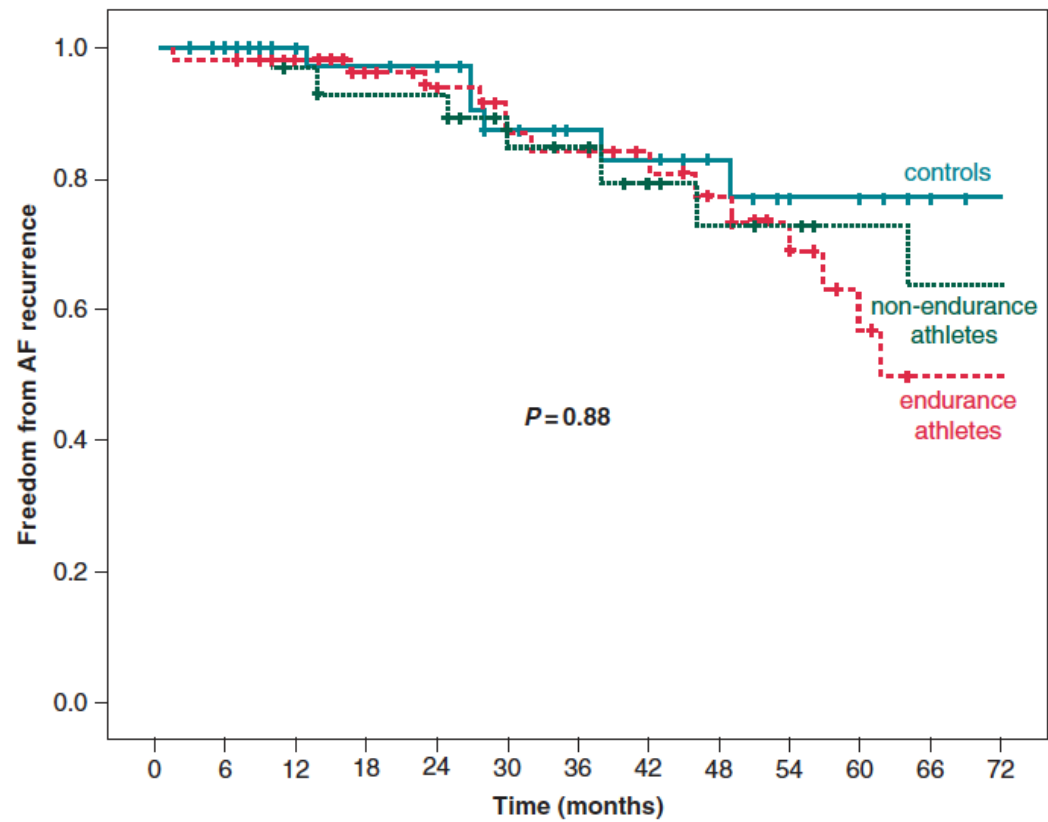
Figure 3 Freedom from atrial fibrillation recurrence after first ablation procedure. (A) All AF recurrences, AF, atrial fibrillation, P value: log-rank P for 5-year follow-up, endurance athletes vs. non-endurance athletes vs. controls. (B) Documented AF recurrences, AF, atrial fibrillation, P value: log-rank P for 5-year follow-up, endurance athletes vs. non-endurance athletes vs. controls.

Table 3 Univariate Cox regression analysis, predictors for recurrence of atrial fibrillation on or off drugs after a single ablation procedure

Covariate	Hazard ratio	P value
Age (years)	0.987 (0.959–1.016)	0.39
Male gender	1.586 (0.832–3.025)	0.16
Persistent AF	1.072 (0.533–2.156)	0.84
AF duration (years)	1.012 (0.974–1.053)	0.54
Echocardiography		
LAD	1.006 (0.972–1.040)	0.74
LVEDD	1.029 (0.977–1.084)	0.28
LVEF	0.973 (0.941–1.006)	0.11
AHT	0.874 (0.513–1.490)	0.62
Lone AF	1.046 (0.654–1.671)	0.85
Sports practice		
Athlete	0.858 (0.516–1.427)	0.56
Sports type		
Non-endurance	0.999 (0.552–1.807)	1.00
Endurance	0.771 (0.457–1.355)	0.37
Lifetime (hours)	1.000 (1.000–1.000)	0.25
Since 14 years of age (hours/week)	0.976 (0.936–1.017)	0.25
After first ablation (hours/week)	0.967 (0.903–1.037)	0.35
PVI		
Ipsilateral circumferential	1.758 (0.950–3.253)	0.07
Additional lines	1.144 (0.626–2.091)	0.66

Efficacy of radiofrequency catheter ablation in athletes with atrial fibrillation

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Number of patients at risk						
controls	41	36	32	20	14	10
endurance	59	55	42	33	20	10
non-endurance	35	28	25	18	10	8

Figure 2 Final outcome after multiple ablations, on or off drugs. AF, atrial fibrillation. *P* value: log-rank *P* for 5-year follow-up, endurance athletes vs. non-endurance athletes vs. controls.

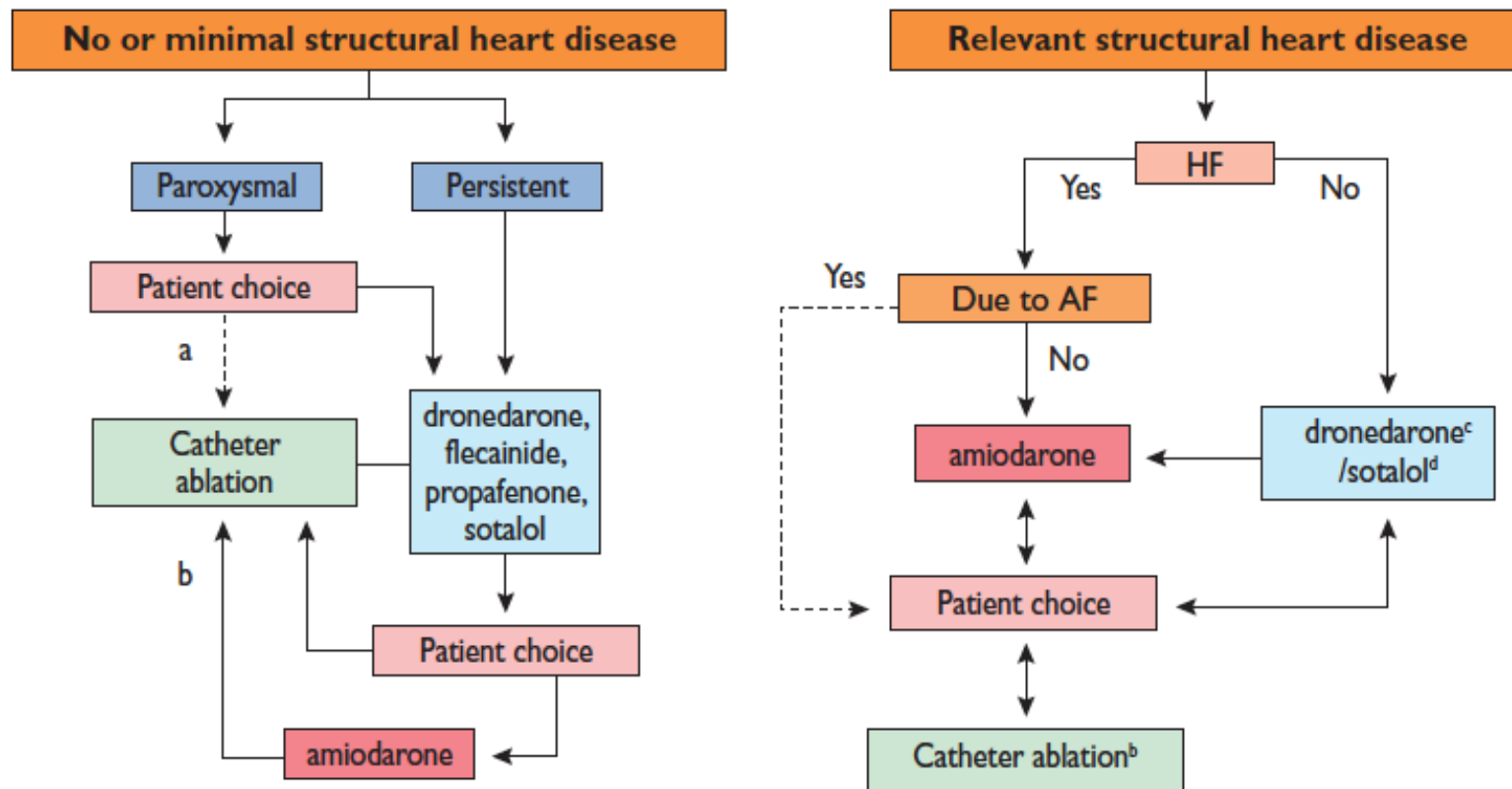
Les sportifs : Cryoablation CHU Grenoble

- ❑ 41 patients sur 411 patients successifs
 - ❑ FA paroxystique : 34 / FA persistante : 7
 - ❑ Age moyen : 57 ans (extrêmes 27-65)
 - ❑ Sports :
 - alpinisme, guide hte montagne : 7
 - cyclisme : 8
 - ski de fond : 3
 - marathon : 3
 - rugby : 4
 - ❑ Nombre de procédures/patients :
 - 1 procédure : 32 patients
 - 2 procédures : 8 patients
 - 3 procédures : 1 patient
 - ❑ Ablation flutter : 6 patients
 - ❑ Succès : 35/41 patients asymptomatiques à 17±14 mois de suivi
- re-ablation : 21%

Left Atrial Ablation

Recommendations for left atrial ablation

Recommendations	Class	Level
Catheter ablation of symptomatic paroxysmal AF is recommended in patients who have symptomatic recurrences of AF on antiarrhythmic drug therapy (amiodarone, dronedarone, flecainide, propafenone, sotalol) and who prefer further rhythm control therapy, when performed by an electrophysiologist who has received appropriate training and is performing the procedure in an experienced centre.	I	A
Catheter ablation of AF should be considered as <u>first-line</u> therapy in selected patients with symptomatic, paroxysmal AF as an alternative to antiarrhythmic drug therapy, considering patient choice, benefit, and risk.	IIa	B



AF = atrial fibrillation; HF = heart failure. ^aUsually pulmonary vein isolation is appropriate. ^bMore extensive left atrial ablation may be needed. ^cCaution with coronary heart disease. ^dNot recommended with left ventricular hypertrophy. Heart failure due to AF = tachycardiomyopathy.

Figure 5 Antiarrhythmic drugs and/or left atrial ablation for rhythm control in AF.

Recommendations for competitive sports participation in athletes with cardiovascular disease

A consensus document from the Study Group of Sports Cardiology of the Working Group of Cardiac Rehabilitation and Exercise Physiology and the Working Group of Myocardial and Pericardial Diseases of the European Society of Cardiology

Antonio Pelliccia^{1*}, Robert Fagard², Hans Halvor Bjørnstad³, Aris Anastassakis⁴, Eloisa Arbustini⁵, Deodato Assanelli⁶, Alessandro Biffi¹, Mats Borjesson⁷, François Carré⁸, Domenico Corrado⁹, Pietro Delise¹⁰, Uwe Dorwarth¹¹, Asle Hirth³, Hein Heidbuchel¹², Ellen Hoffmann¹¹, Klaus P. Mellwig¹³, Nicole Panhuyzen-Goedkoop¹⁴, Angela Pisani⁵, Erik E. Solberg¹⁵, Frank van-Buuren¹³, and Luc Vanhees²

Atrial fibrillation

The prevalence of AF in competitive athletes is not well known, although is supposed to be higher than in the general population. In ~40% of athletes with AF, a possible substrate, such as WPW syndrome, cardiomyopathy, or silent myocarditis can be found.^{82,84} Use of doping substances, such as anabolic steroids, can possibly cause AF in athletes.⁸⁵

Pulmonary vein catheter ablation is well established as a routine procedure in focal AF, due to limited long-term

success rate (50–80%) and minimal complications (pulmonary vein stenosis, atrial thrombosis, peri-procedural stroke in 3–10%). In athletes with unsuccessful rhythm control or in athletes on long-term antiarrhythmic therapy, anticoagulation may be necessary, depending also on the presence of risk factor for thrombo-embolic events.

Atrial flutter

Atrial flutter is uncommon in the young healthy population. The electrophysiologic substrate for atrial flutter of the common type is a counter-clockwise re-entrant circuit around the tricuspid valve. In athletes with atrial flutter, the presence of structural heart disease, such as cardiomyopathy, should be excluded, because it is often the basis of this arrhythmia. Atrial flutter may convey an increased thrombo-embolic risk and may be life-threatening due to potential 1:1 conduction to the ventricles.

Catheter ablation of the isthmus is a highly effective and safe procedure⁸⁶ and is recommended as first-line therapy in

athletes. Anticoagulation therapy in atrial flutter follows the same recommendations as in AF. In the presence of combined atrial flutter and fibrillation, isthmus ablation is recommended, followed by drug therapy for AF ('hybrid therapy').

Recommendations

See *Table 9*.

Athletes with structural heart disease and atrial flutter can participate in competitive sports consistent with the limitation of the disease, only after successful catheter ablation and in the absence of recurrence of arrhythmia for >3 months. For athletes with atrial flutter and ventricular pre-excitation: see ventricular pre-excitation. Athletes who require anticoagulation therapy should not participate in sports with danger of bodily collision or trauma (*Table 1*).

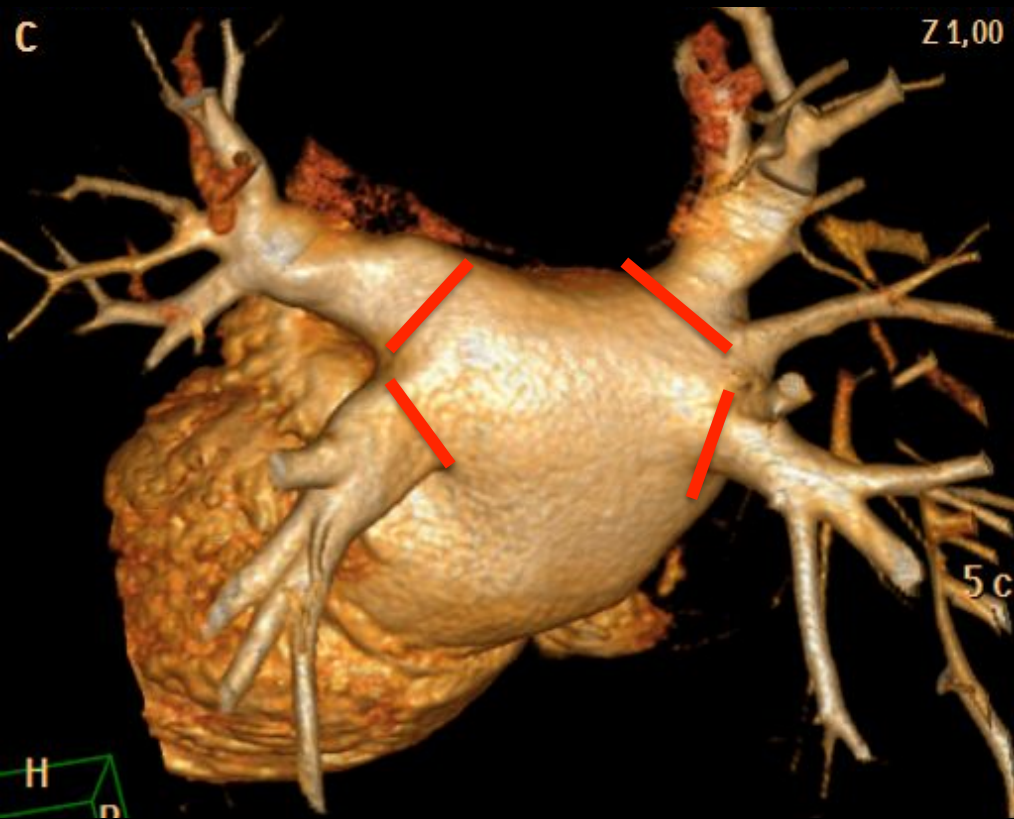
Task Force 7: Arrhythmias

Douglas P. Zipes, MD, MACC, *Chair*

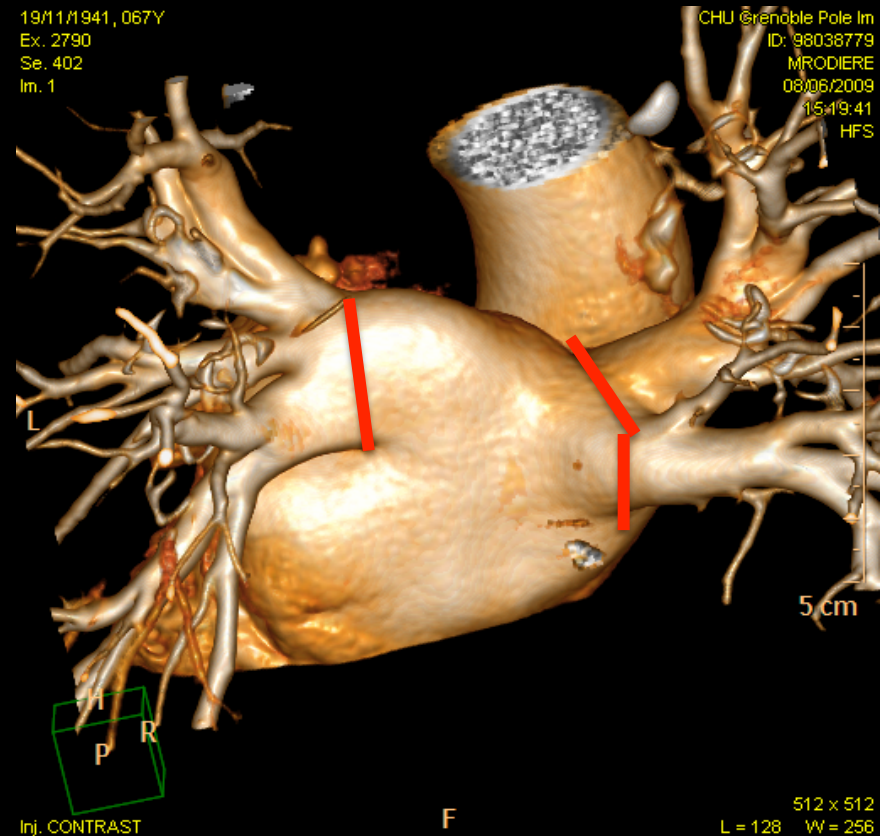
Michael J. Ackerman, MD, PhD, FACC, N. A. Mark Estes III, MD, FACC,
Augustus O. Grant, MB, ChB, PhD, FACC, Robert J. Myerburg, MD, FACC,
George Van Hare, MD, FACC

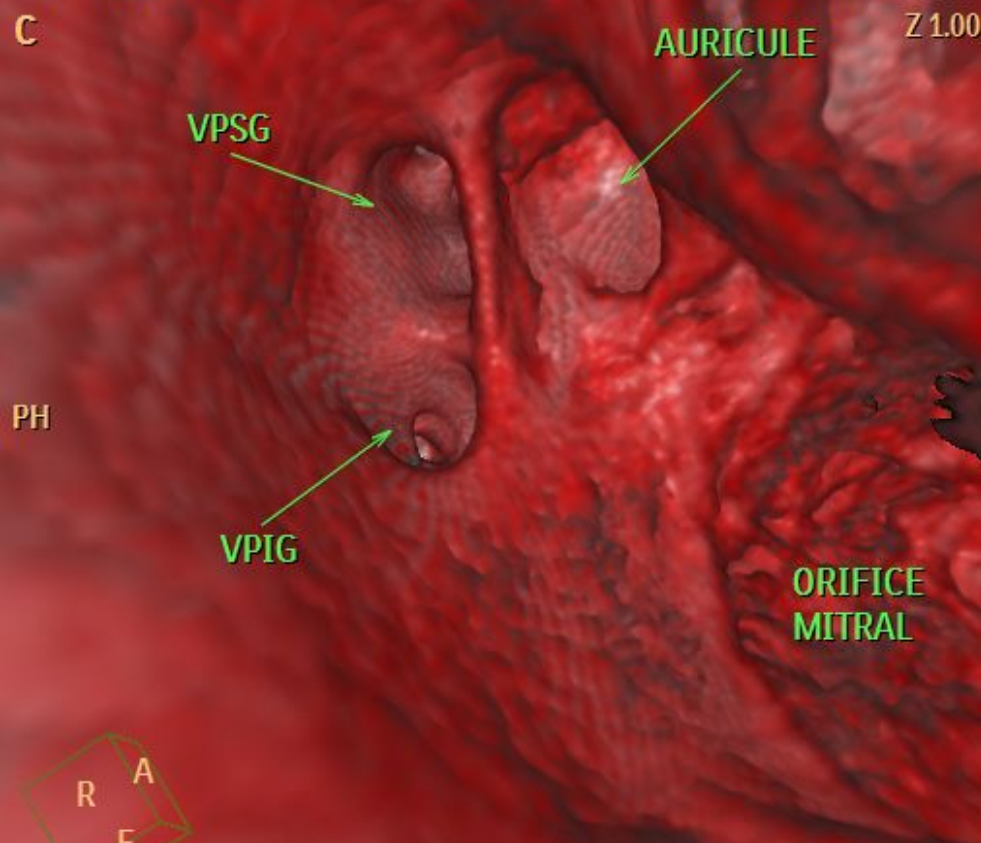
4. **Athletes without structural heart disease who have elimination of atrial fibrillation by an ablation technique, including surgery, may participate in all competitive sports after four to six weeks without a recurrence or after an electrophysiologic study has confirmed non-inducibility.**

Quelle technique?

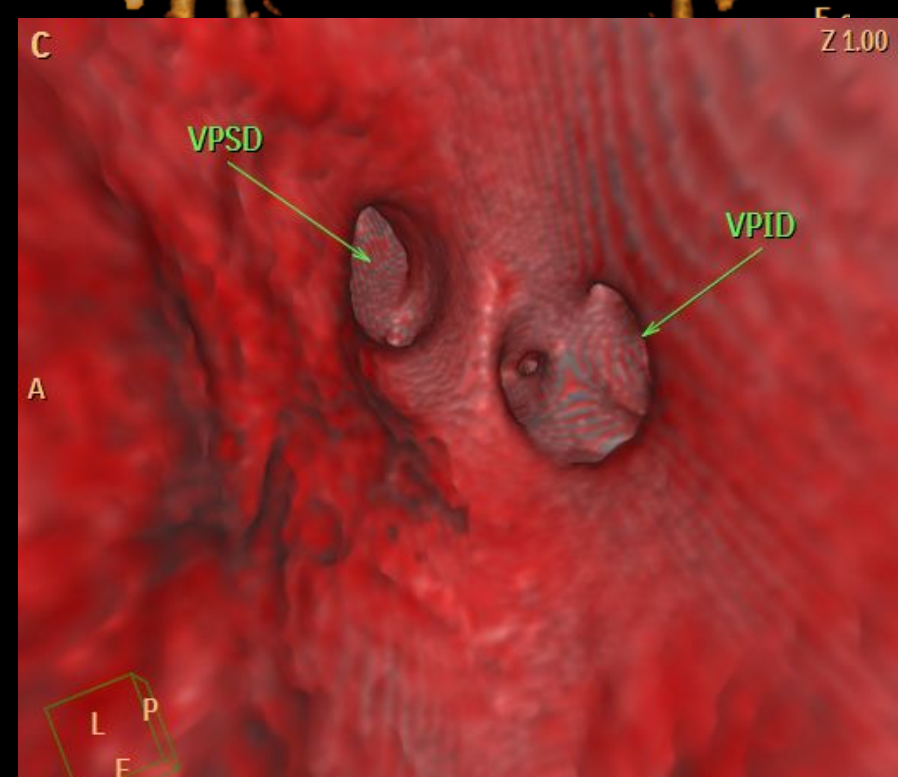


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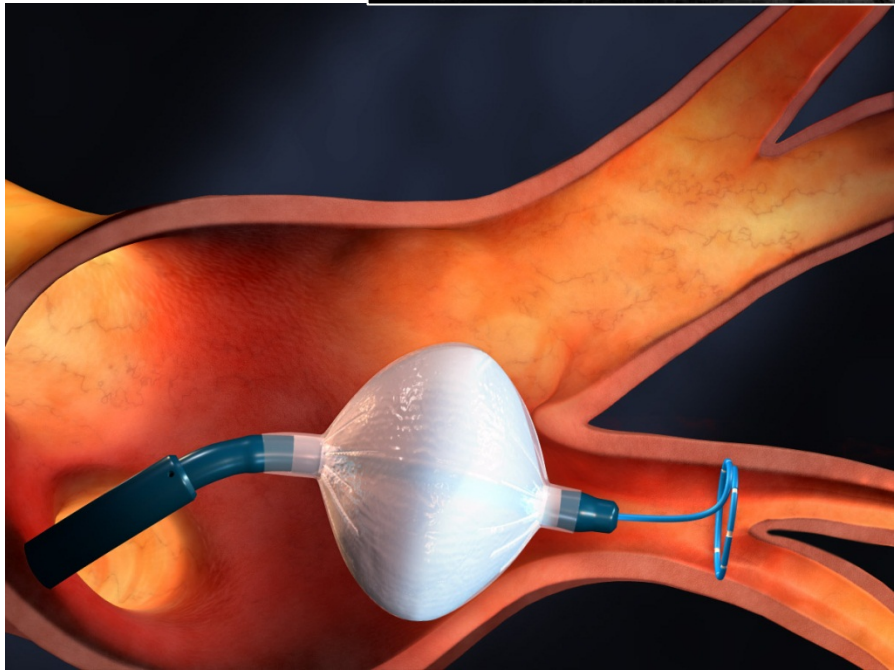
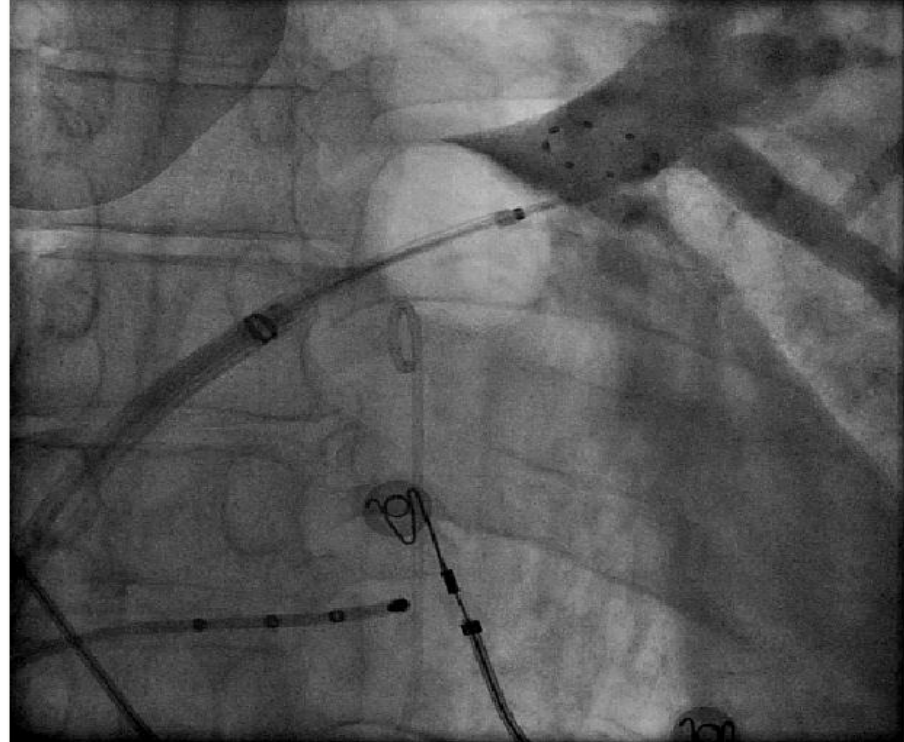
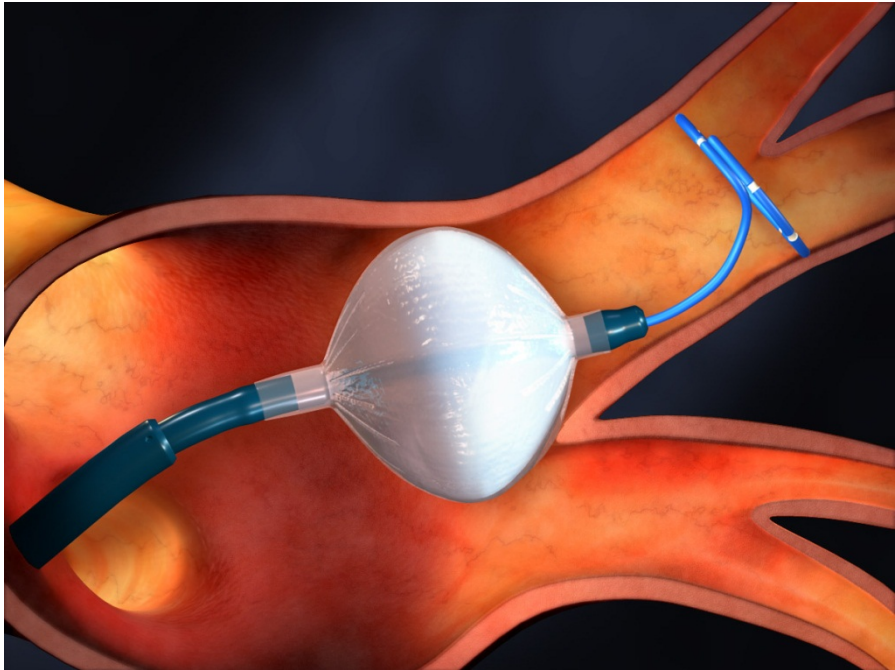
Quelle technique?



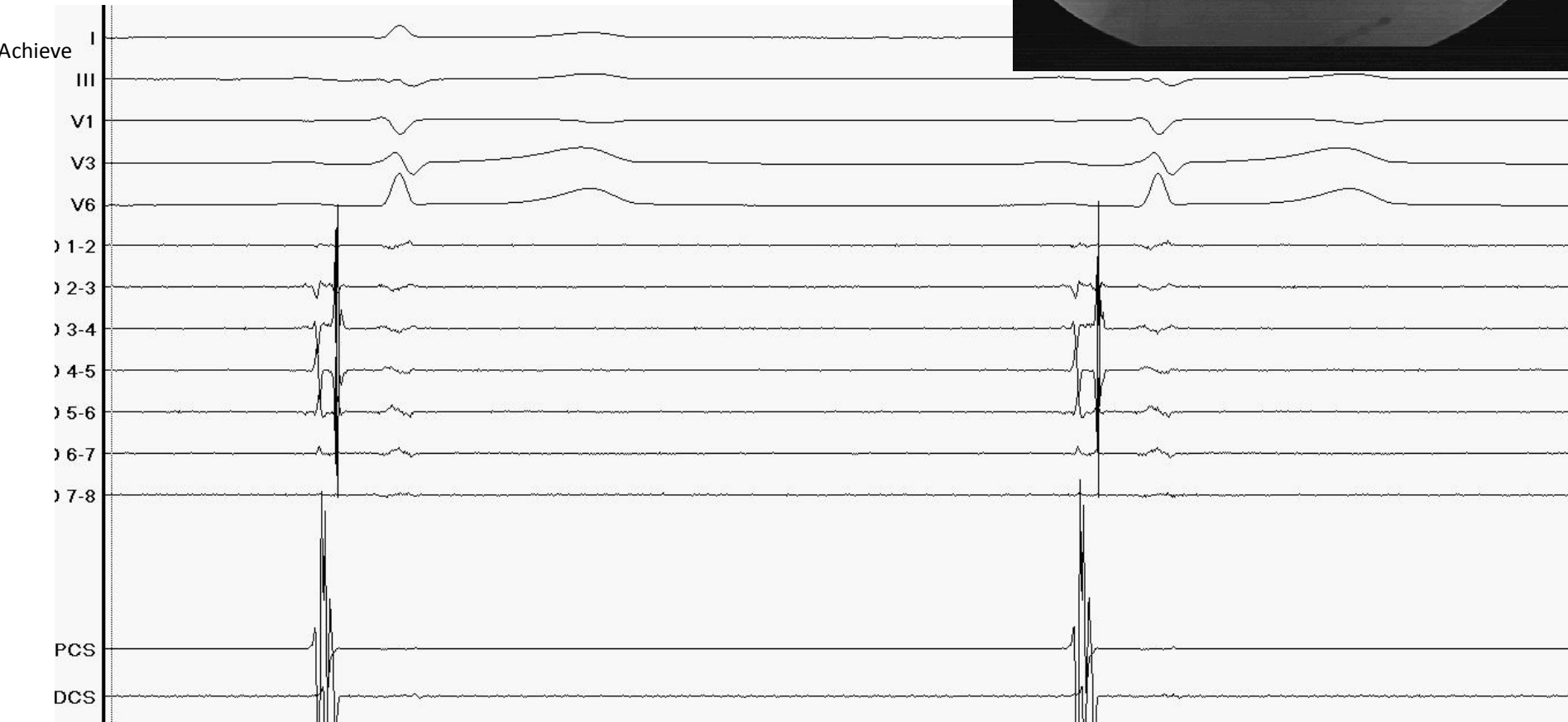
Quelle technique?



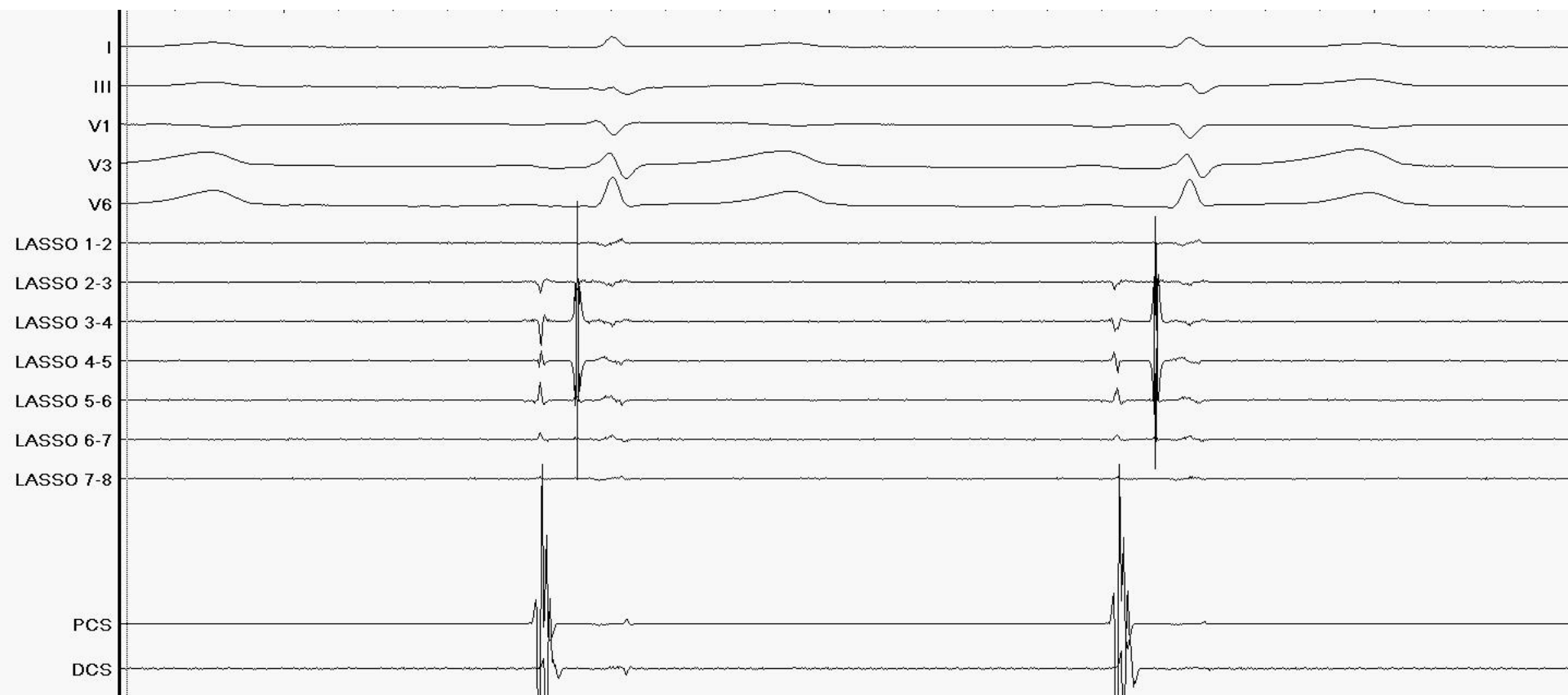
Cryoballoon ablation



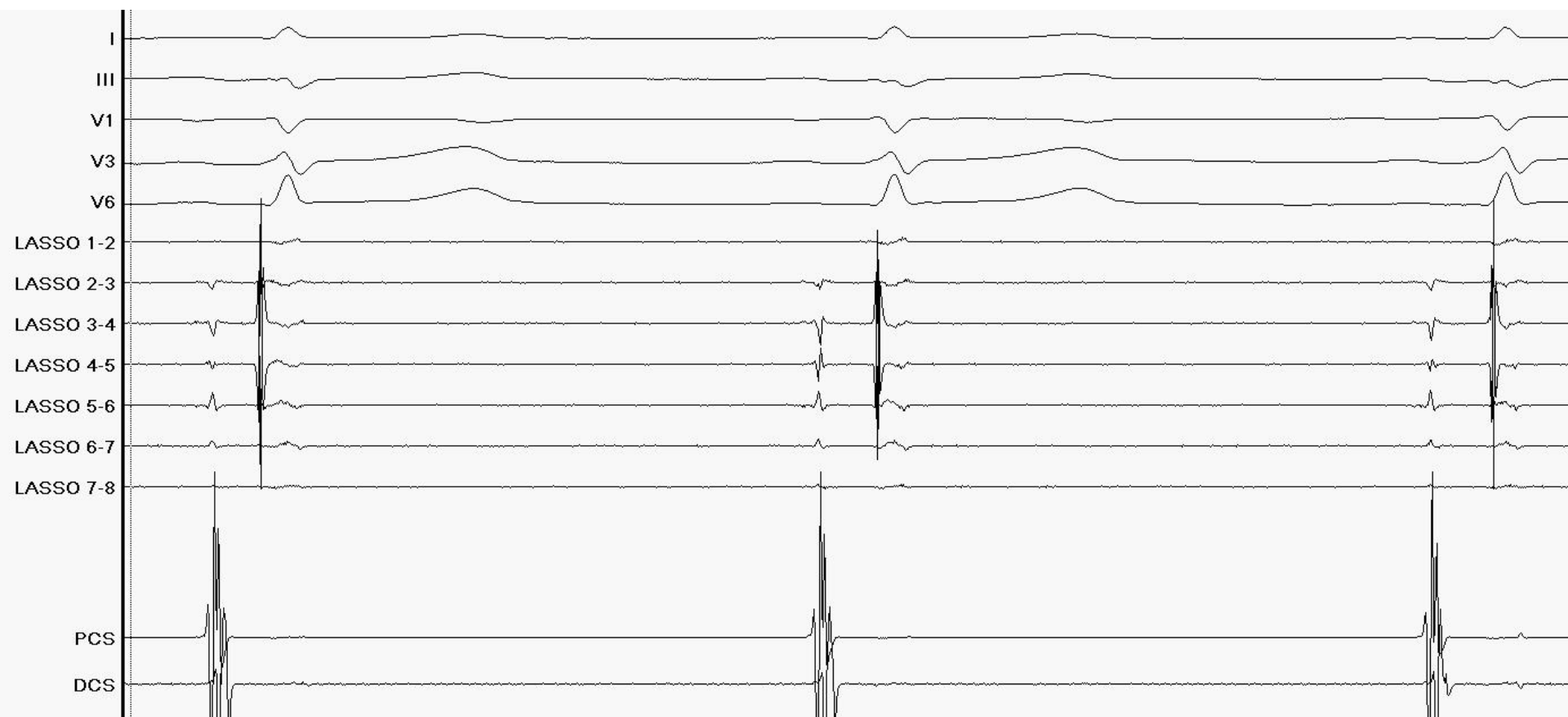
Mr Du...
LSPV /
Achieve



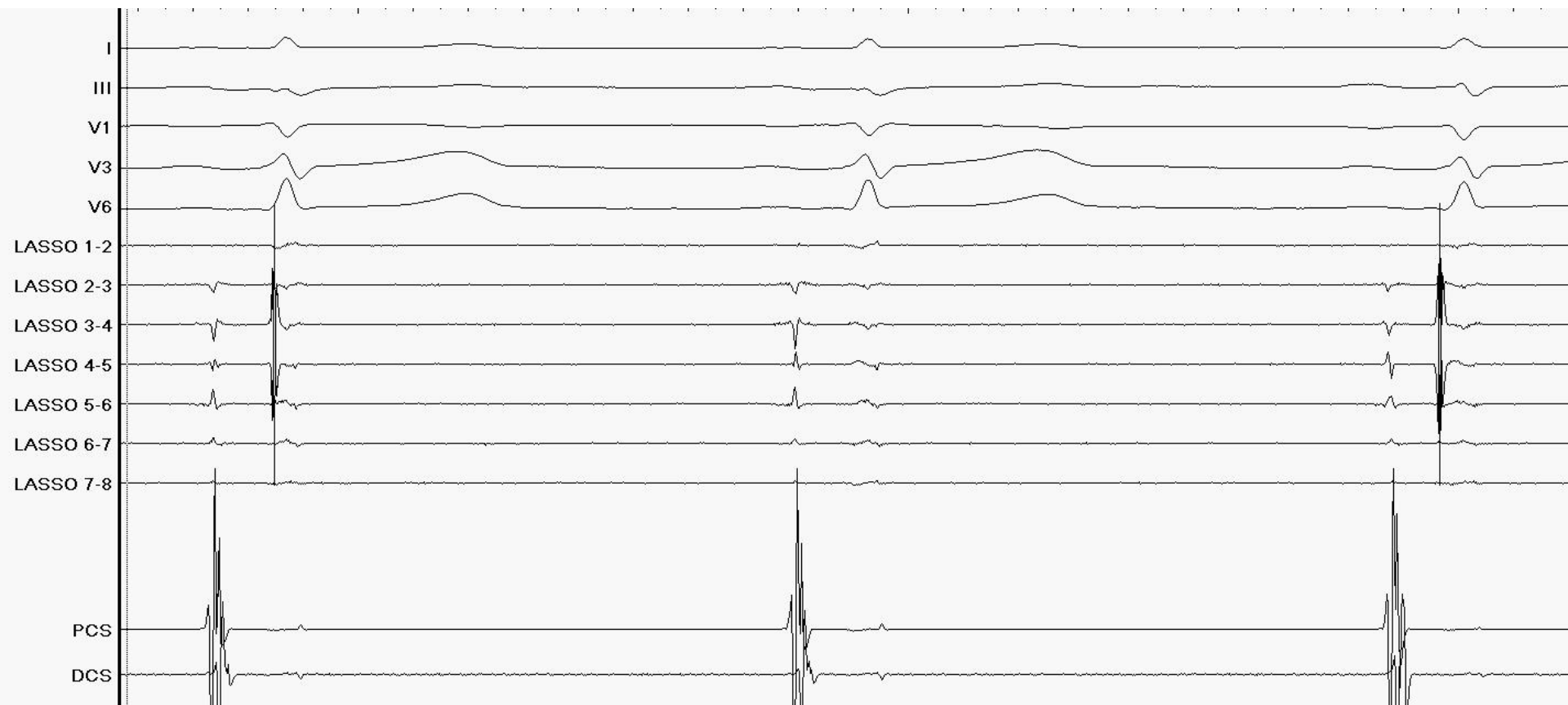
Mr Du..., LSPV beginning cryo



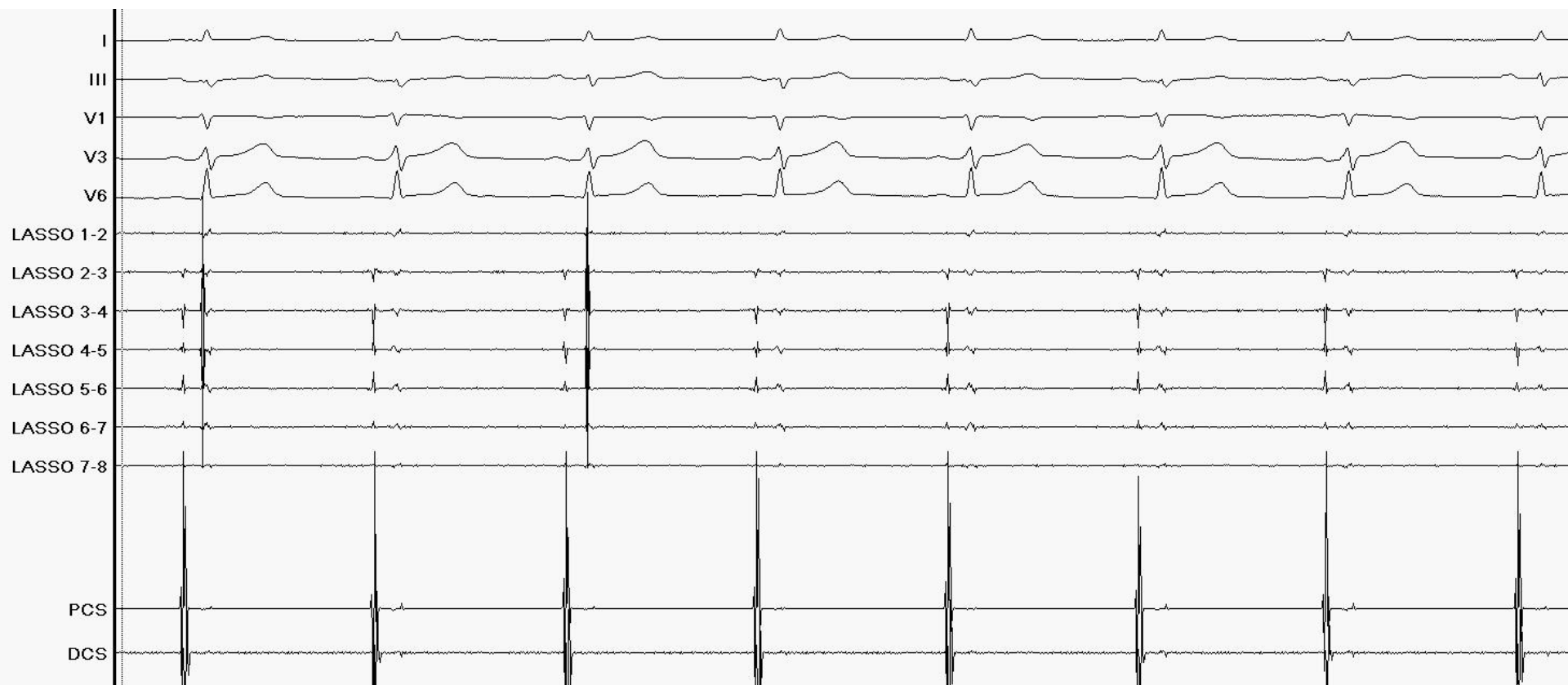
Mr Du..., LSPV, 20 sec 28 mm cryoballoon



Mr Du..., LSPV, 25 sec 28 mm cryoballoon



Mr Du..., LSPV, 35 sec 28 mm cryoballoon

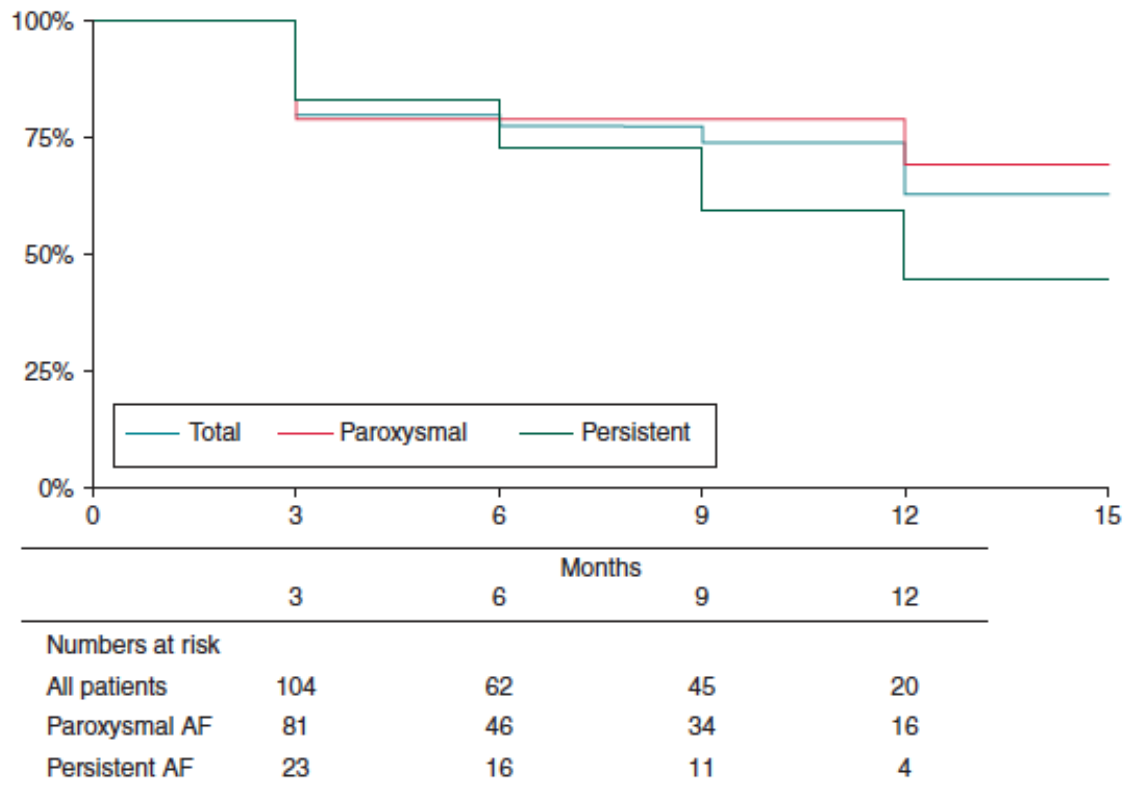


Mr Du..., LSPV, 40 sec 28 mm cryoballoon, isolation

Efficacy and safety of pulmonary veins isolation by cryoablation for the treatment of paroxysmal and persistent atrial fibrillation

No patient selection
All paroxysmal AF with cryoballoon

Pascal Defaye*, Adama Kane, Ali Chaib, and Peggy Jacon

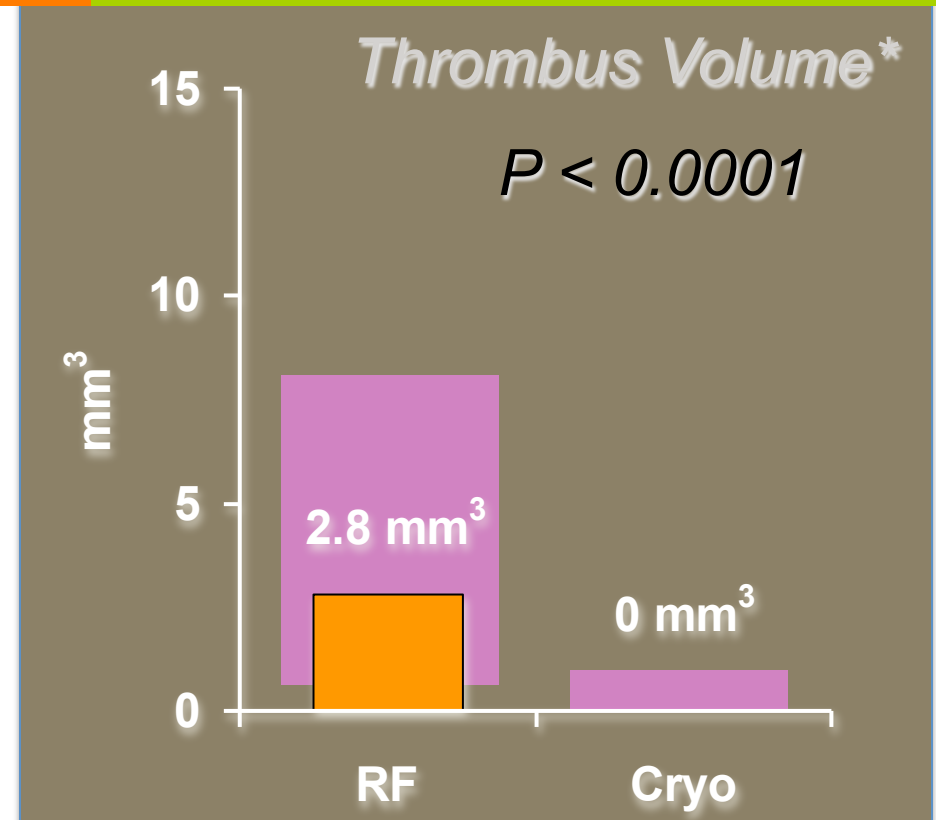


Cumulative AF-free survivals of patients who underwent cryoablation for paroxysmal AF versus persistent AF, $p=0,167$

76% free of AAD

Thrombus formation

“For endocardial ablation lesions of equal size, ablation using RF energy confers **a >5-fold increased risk of thrombus formation**, with larger thrombus volumes, compared with cryoenergy.”



RF: +70°C - 50 W • 60 seconds

Cryo: -75°C • 1 x 4 minutes

*Values are median values with 25th and 75th interquartile range represented by purple box.

Incidence of Asymptomatic Intracranial Embolic Events After Pulmonary Vein Isolation

Comparison of Different Atrial Fibrillation Ablation Technologies in a Multicenter Study

Claudia Herrera Siklódy, MD,* Thomas Deneke, MD,‡ Méléze Hocini, MD,§ Heiko Lehrmann, MD,* Dong-In Shin, MD,‡ Shinsuke Miyazaki, MD,§ Susanne Henschke, MD,† Peter Fluegel, MD,† Jochen Schiebeling-Römer, MD,* Paul M. Bansmann, MD,‡ Thomas Bourdias, MD,§ Vincent Dousset, MD,§ Michel Haissaguerre, MD,§ Thomas Arentz, MD*
Bad Krozingen and Köln, Germany; and Bordeaux-Pessac, France

Table 1 Patient Characteristics				
	Externally Irrigated RF Group (n = 27)	Cryoballoon Group (n = 23)	PVAC (n = 24)	p Value
Age, yrs	61 ± 10	61 ± 7	59 ± 10	0.62
Male	20 (74)	15 (65)	15 (63)	0.65
Hypertension	16 (59)	14 (61)	11 (43)	0.51
Structural heart disease	6 (22): CHD, 3; myocarditis, 1; tachymyopathy, 2	3 (13): CHD, 1; valvular, 1; DCMP, 1	6 (25): CHD, 5; DCMP, 1	0.57
Persistent AF	14 (52)	8 (35)	6 (25)	0.13
LA, mm	42 ± 5	40 ± 6	41 ± 5	0.47
Chronic lesions on MRI before ablation	6 (22)	2 (9)	1 (4)	0.16
CHA ₂ DS ₂ VASc score	1.7 ± 1.5	1.7 ± 1.3	1.3 ± 1.0	0.52

Table 3 Characteristics of New Embolic Events in All 3 Groups			
	Externally Irrigated RF Group (n = 27)	Cryoballoon Group (n = 23)	PVAC (n = 24)
Patients with new embolic events	2 (7.4)	1 (4.3)	9 (37.5)
No. of embolic lesions/patient	1	1	2.7 ± 1.3
Size of embolic lesions, mm	6	4	6.0 (4.5–8.5)
Localization of embolic lesions	Frontal (right): 1, cerebellar (left): 1	Temporo-occipital (right): 1	Cerebellar: 10 parietal: 5 occipital: 4 frontal: 5 *(13 right, 11 left)

Incidence of Silent Cerebral Thromboembolic Lesions After Atrial Fibrillation Ablation May Change According to Technology Used: Comparison of Irrigated Radiofrequency, Multipolar Nonirrigated Catheter and Cryoballoon

FIorenzo GAITA, M.D.,*,† JEAN FRANÇOIS LECLERCQ, M.D.,‡
BURGHARD SCHUMACHER, M.D.,§ MARCO SCAGLIONE, M.D.,†
ELISABETTA TOSO, M.D.,*,† FRANCK HALIMI, M.D.,‡ ANJA SCHADE, M.D.,§
STEFFEN FROEHNER, M.D.,¶ VOLKER ZIEGLER, M.D.,# DOMENICO SERGI, M.D.,†
FEDERICO CESARANI, M.D.,** and ALESSANDRO BLANDINO, M.D.,*,†

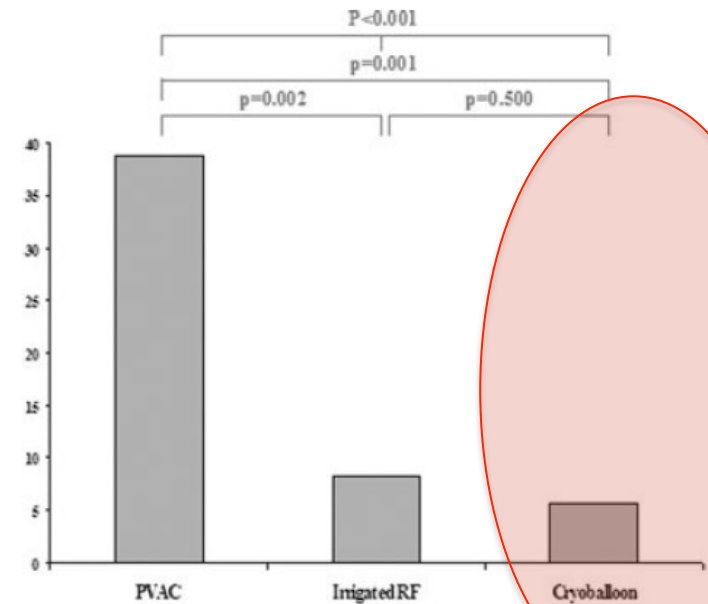


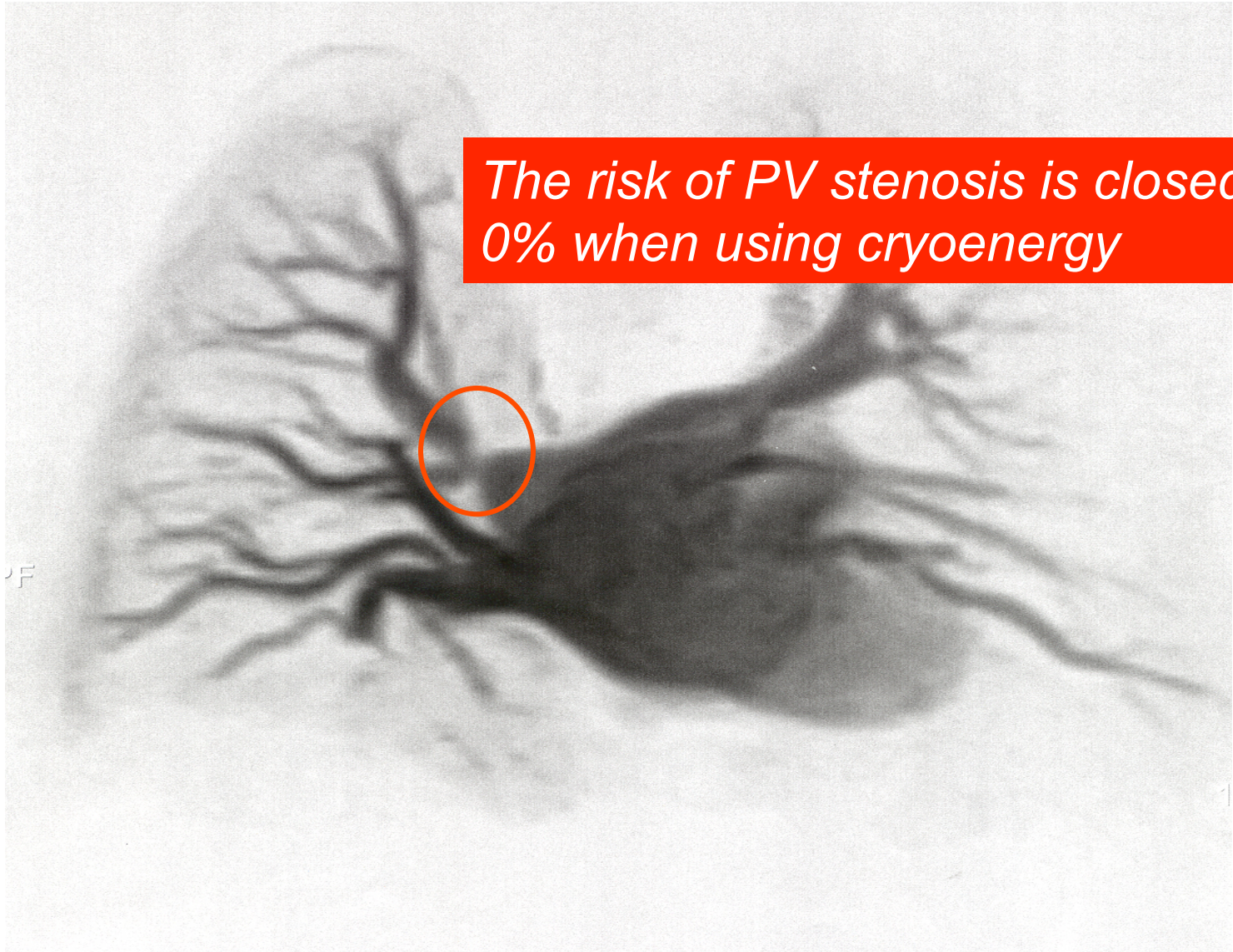
Figure 1. Distribution of silent cerebral ischemic events based on the type of ablation technology used: total amount of positive patients (%) in each

TABLE 1

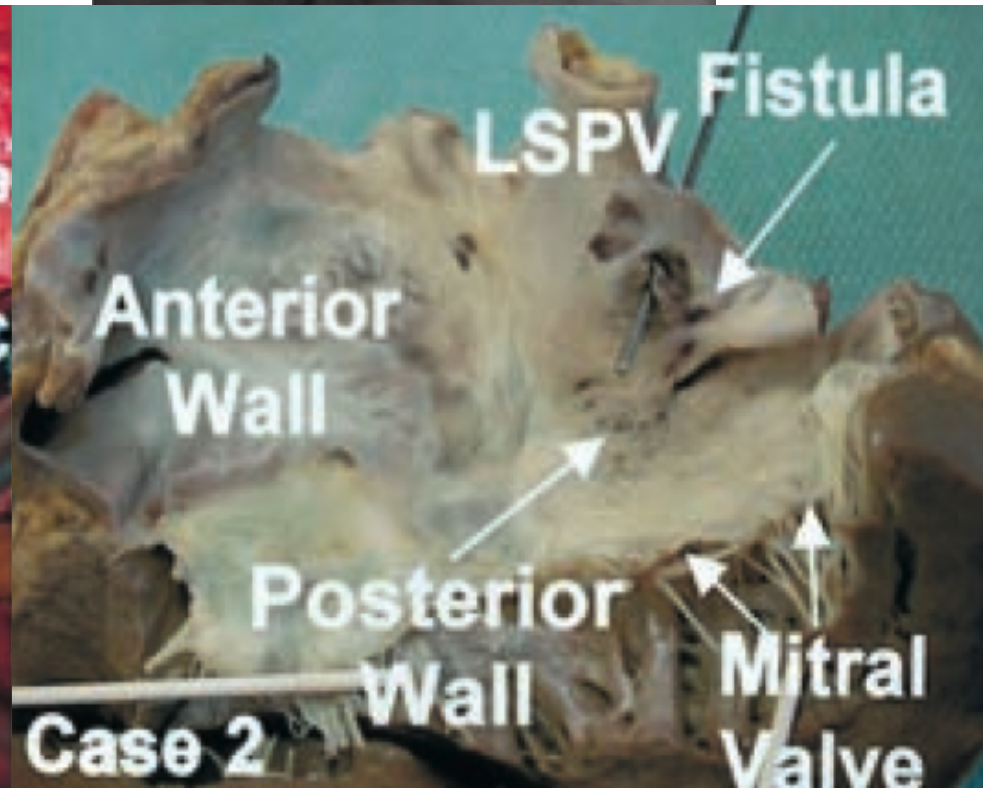
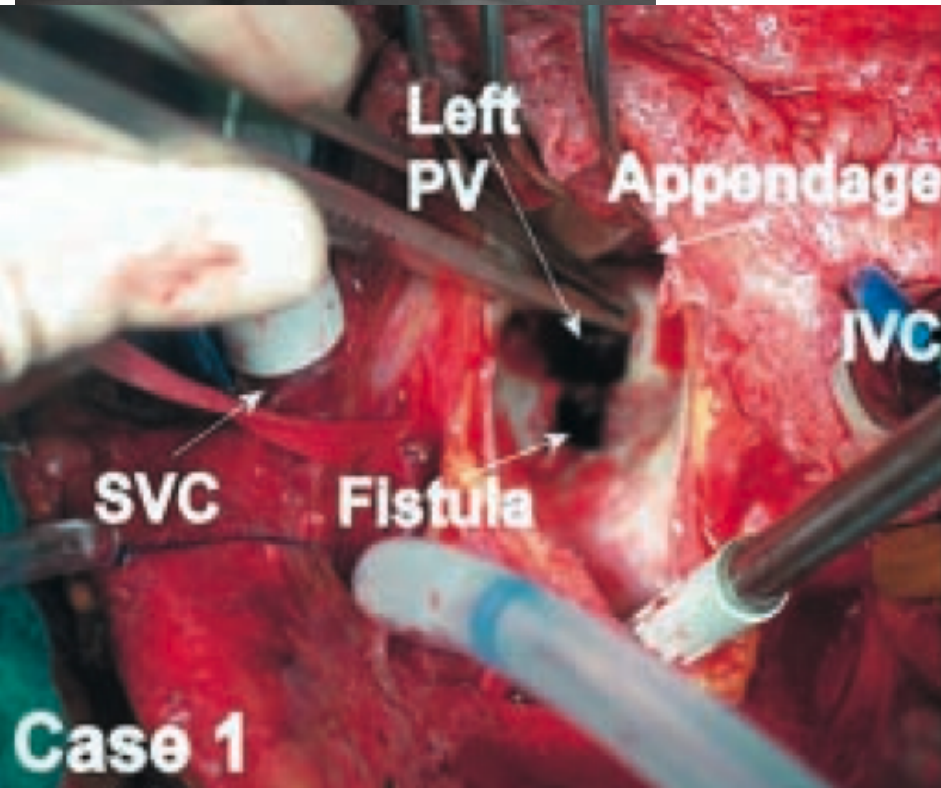
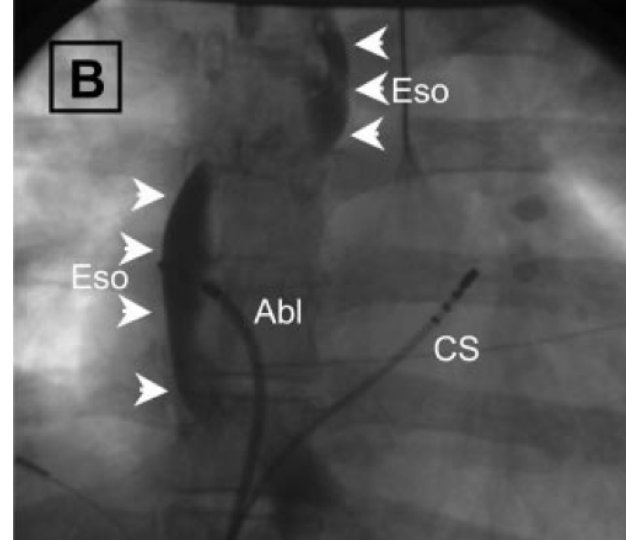
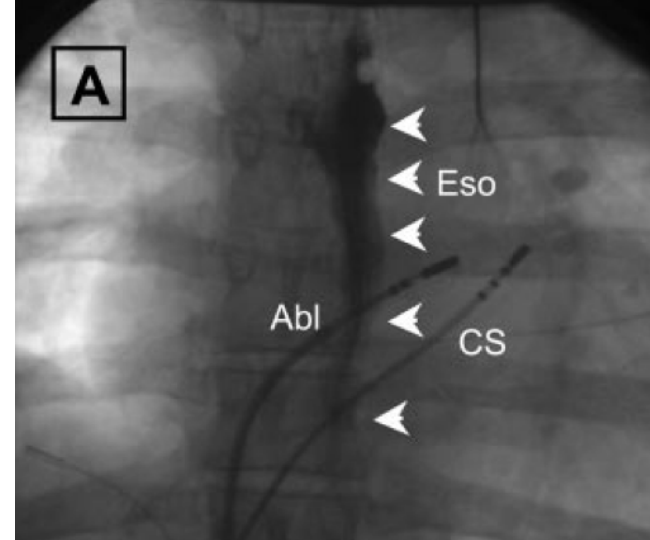
Clinical and Procedural Characteristics of Population Divided into 3 Groups According to the Type of Ablation Technology

Population	Group 1, 36 pts	Group 2, 36 pts	Group 3, 36 pts	P
Gender (male)	24 (67%)	23 (64%)	25 (69%)	0.882
Mean age (years)	57 ± 7	57 ± 9	55 ± 12	0.713
Hypertension	19 (53%)	12 (33%)	20 (57%)	0.120
Dyslipidemia	11 (31%)	5 (14%)	13 (36%)	0.09
Dysthyroidism	8 (22%)	2 (6%)	4 (11%)	0.10
Left ventricular ejection fraction (%)	64 ± 4	62 ± 4	63 ± 7	0.218
Left atrium antero-posterior diameter (mm)	43 ± 6	45 ± 6	41 ± 5	0.189
First documentation (months)	80 ± 55	47 ± 30	61 ± 53	0.165
Procedural duration (minutes)	123 ± 45	127 ± 53	147 ± 32	0.137
Fluoroscopy time (minutes)	16 ± 14	20 ± 10	37 ± 18	0.001
Mean ACT (seconds)	310 ± 49	320 ± 49	304 ± 52	0.074

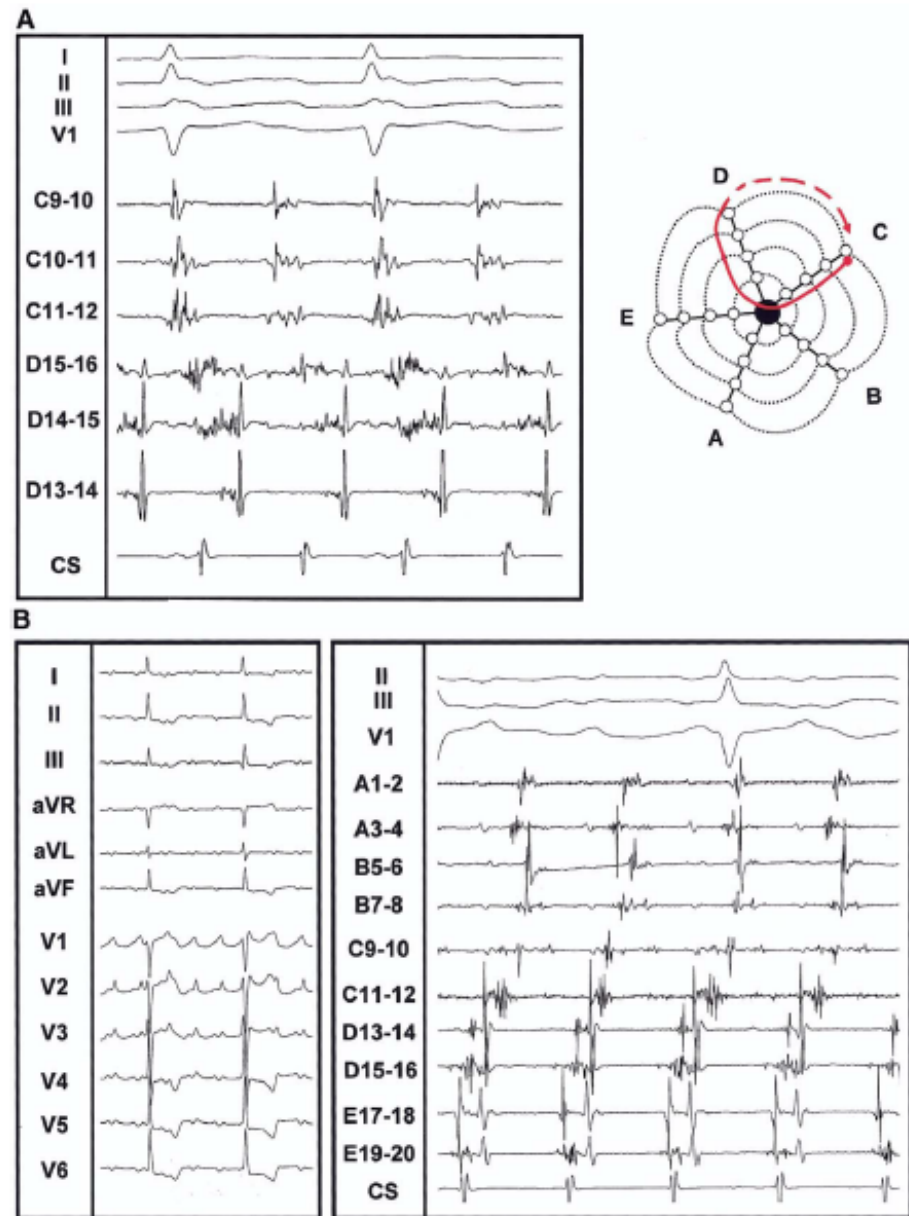
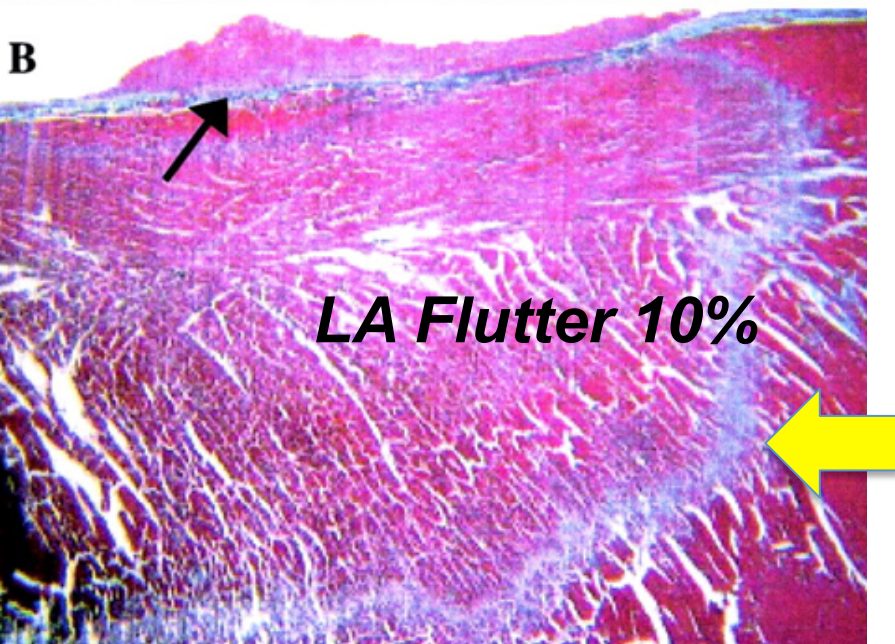
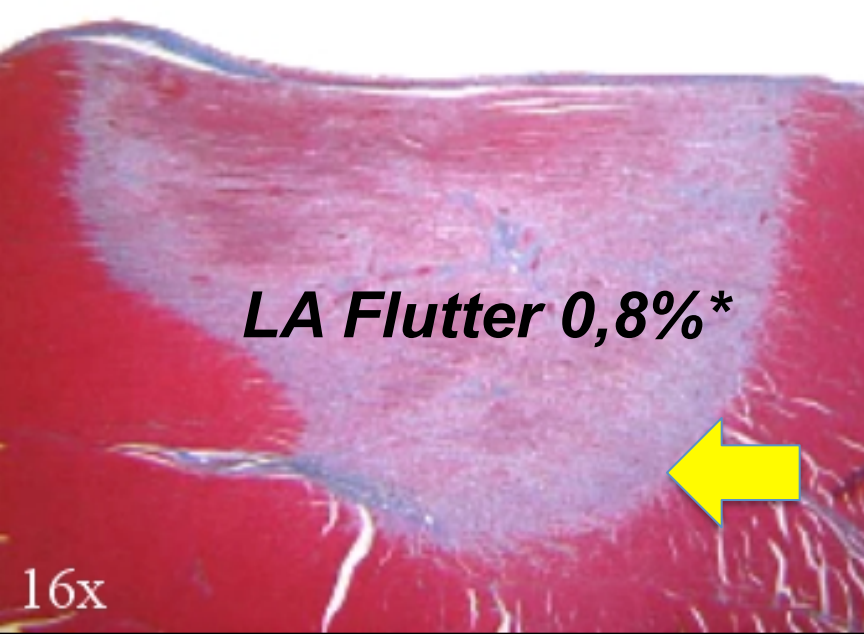
PV stenosis /occlusion



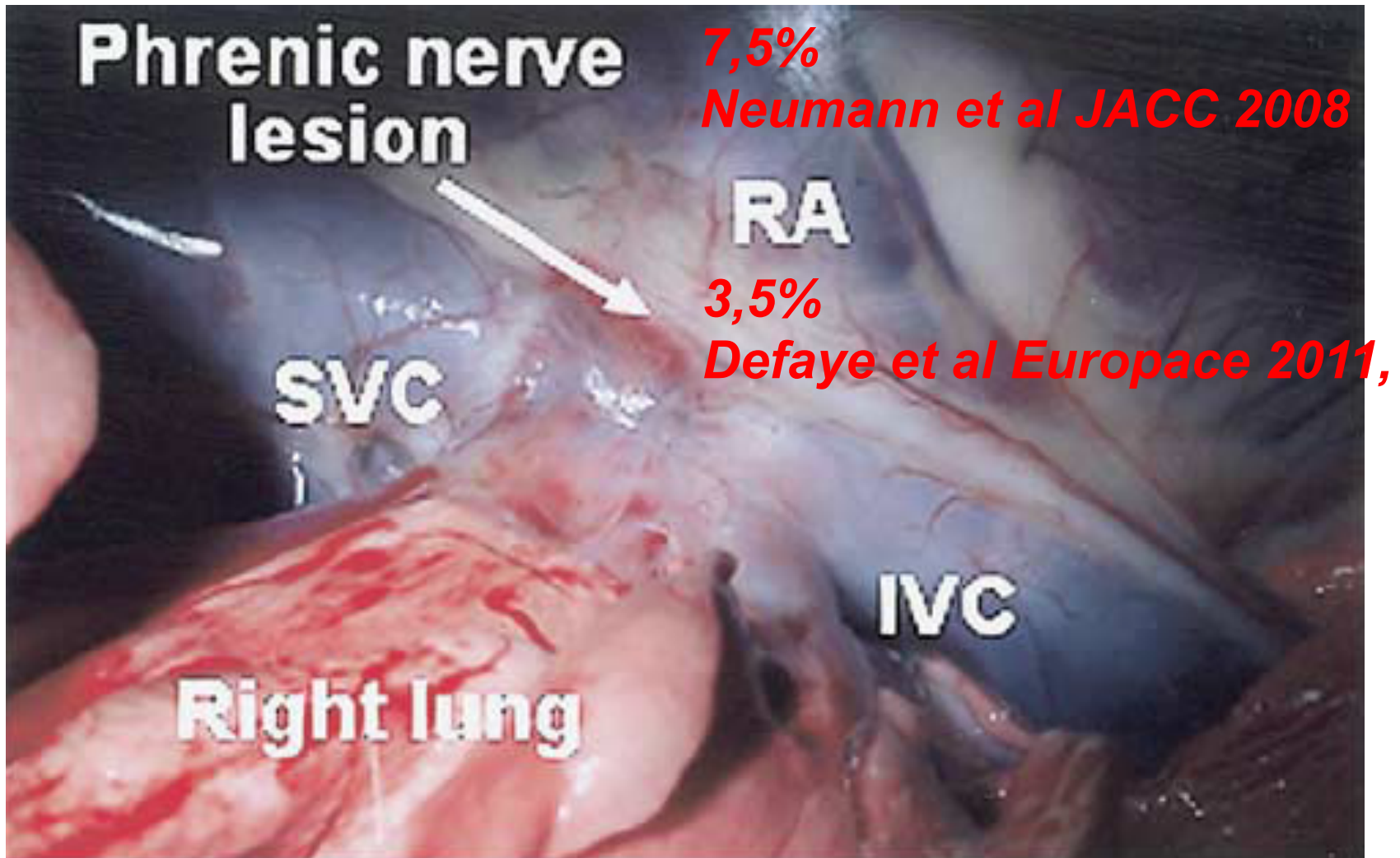
The risk of PV stenosis is closed to 0% when using cryoenergy



Atrio-oesophageal fistula as a complication of percutaneous transcatheter ablation of AF
 Pappone C, Morady F, Circulation 2004;109:2724-26



Phrenic nerve lesion



Sarabanda AV et al. Efficacy and Safety of Circumferential Pulmonary Vein Isolation Using a Novel Cryothermal Balloon Ablation System. J Am Coll Cardiol 2005

Conclusion

- ❑ *L'ablation de la FA paraît être parfaitement adaptée à la FA du sportif :*
 - rôle des VP idem contrôle non sportif
 - difficulté/ contre-indication des AAR en sport
 - difficultés/contre indications de anticoagulants???
- ❑ *L'isolation des VP a le même résultat chez le sportif*
- ❑ Comme chez le non sportif : *meilleurs résultats dans la FA paroxystique*
- ❑ Autres facteurs de moins bons résultats : diamètre OG, fonction VG
- ❑ *Choix de la technique ?? : Cryoablation au ballon :*
 - technique simple
 - morbidité faible :
 - résultats idem/RF

Technique de référence pour cette population