



Risques de fibrillation atriale liés au sport

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Conflits d'intérêts

Aucun C.I. à déclarer pour cette présentation

CARD



John B. 57 ans

Ancien athlète professionnel, sportif (4 heures/sem.)

Légère HTA, pas d'autres facteurs de risque, → **palpitations**

Quasi tous mes compagnons
font aussi de la FA...



Epreuve d'effort :

Effort mené par paliers de 20 W / minute.
Passage en flutter auriculaire avec réponse ventriculaire jusque 166 bpm,
asymptomatique.

Conclusions :

HTA traitée et bien maîtrisée.
Traitement médical et, mesures hygiéno-diététiques.

Passage en Flutter auriculaire avec réponse ventriculaire rapide à l'effort (166 bpm), patient quasi asymptotique.

Un avis rythmologique est programmé: Ablation de l' isthme cavo-tricuspidien ?
Anticoagulation initiée vu le score CHADSVASC à 1.

No° Patient: 0779673

01.04.2022

11:00:42

200 /min

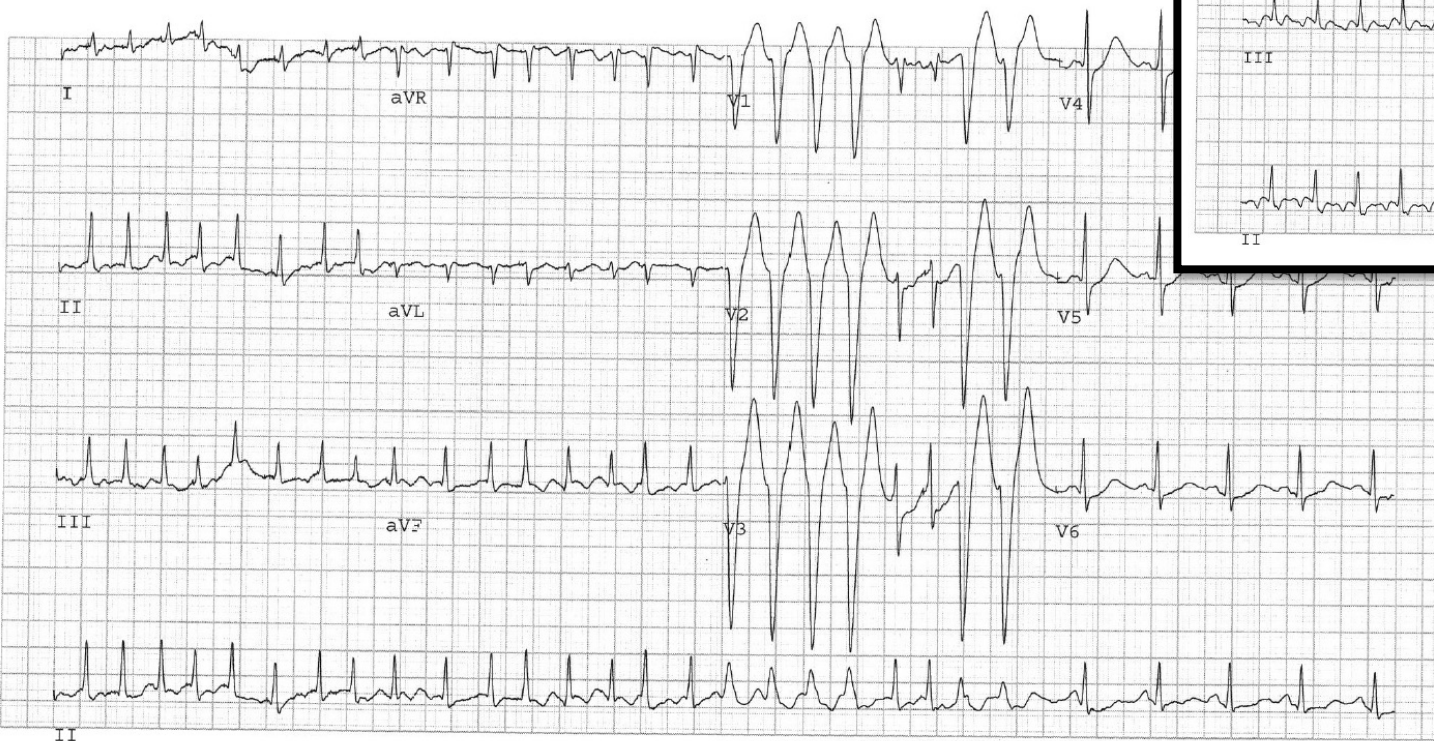
RECUP.

01:46

20+20 1min

0.0 W

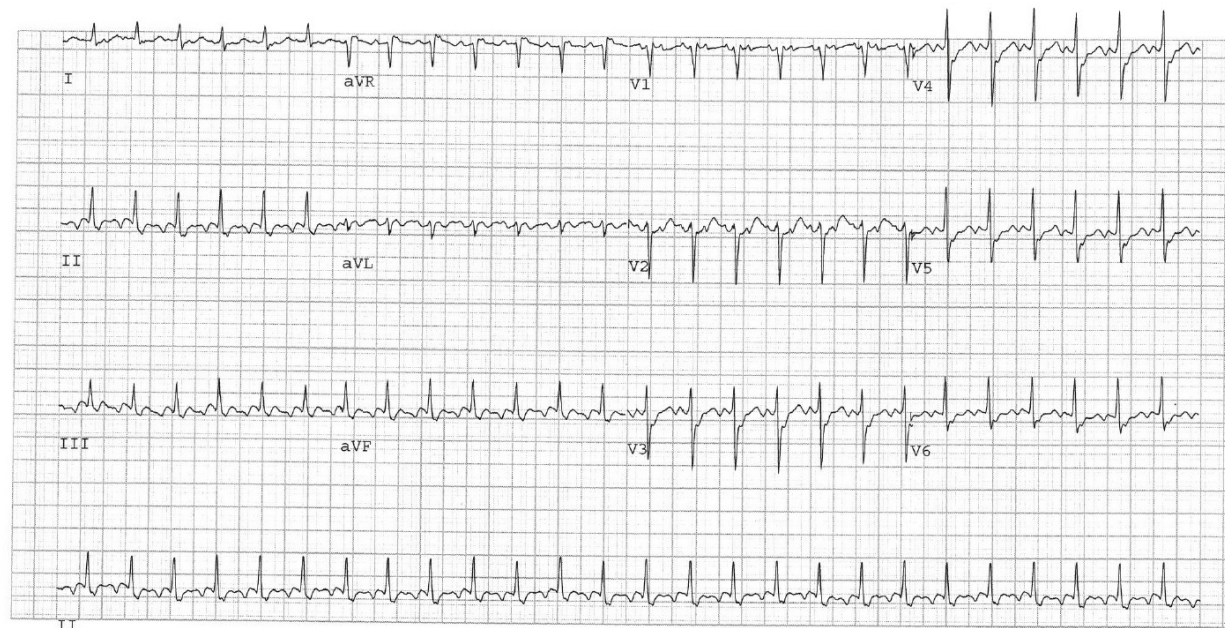
2.0 tpm



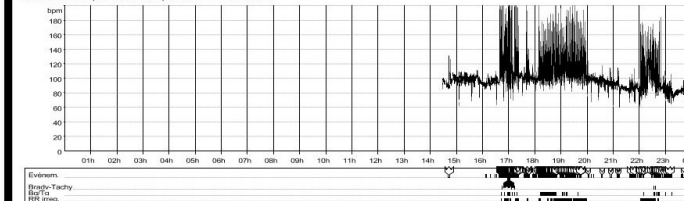
11:02:46

03:50

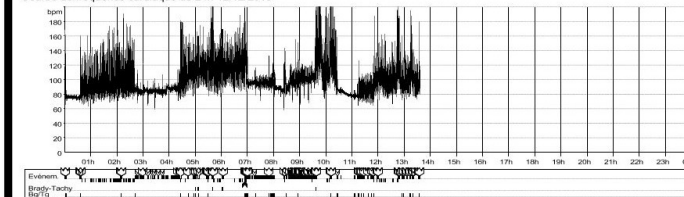
0.0 tpm



Courbe de fréquence cardiaque de 24h 11/12/2018



Courbe de fréquence cardiaque de 24h 12/12/2018





Une relation entre son passé de sportif de haut niveau et sa FA est plausible

- *Vrai*
- *Faux*
- *Je ne sais pas*



**Le meilleur traitement pour ce patient est de
stopper le sport (*detraining*)**

- *Vrai*
- *Faux*
- *Je ne sais pas*



Haimar Zubeldia: Cyclist Continued to Compete After Atrial Fibrillation



Karsten Madsen: Triathlete With Atrial Fibrillation Continues to Compete



Nicola Coles: Olympic Rower Manages Afib Naturally



Deke Slayton: Astronaut Flew With Atrial Fibrillation





90 km cross-country skiing event



European Heart Journal (2013) **34**, 3624–3631
doi:10.1093/eurheartj/eh188

CLINICAL RESEARCH
Sports cardiology

Risk of arrhythmias in 52 755 long-distance cross-country skiers: a cohort study

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See page 3599 for the editorial comment on this article (doi:10.1093/eurheartj/eh188)

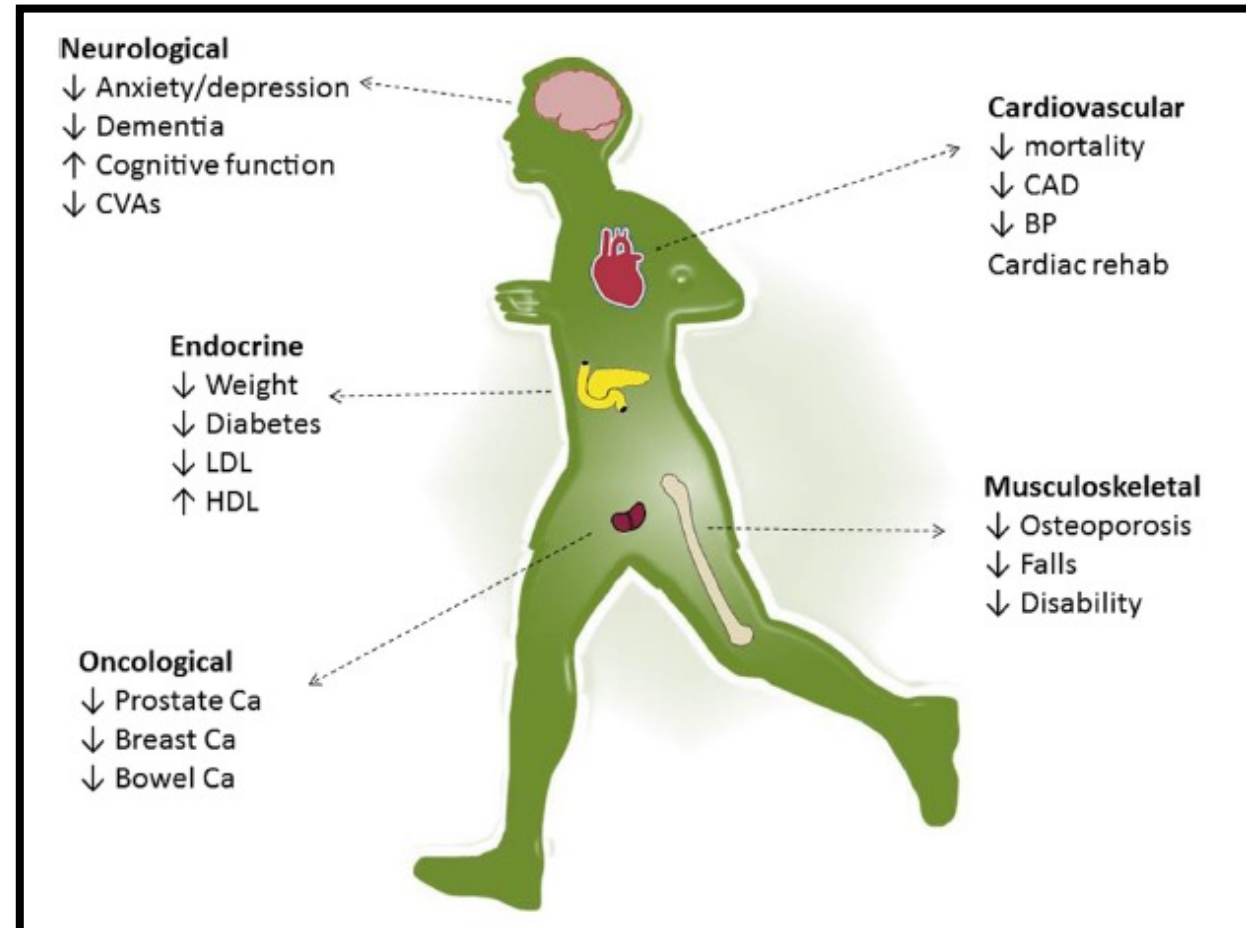
47.477 male and 5.278 female



Physical inactivity is a **major risk factor** for cardiovascular disease

- L'activité physique est **très bénéfique** pour le cœur, le corps et l'esprit.
- L'activité physique contribue à la prévention des maladies CV, cancer et le diabète e.a.
- L'activité physique $\searrow$ les Σ : dépression et d'anxiété.
- L'activité physique $\nearrow$ le bien-être général.

➤ 1 adulte/4 dans le monde ne pratique pas une activité physique aux niveaux recommandés.



Les adultes :

Endurance intensité modérée: minimum **150 à 300'/semaine**.

OU

Endurance intensité soutenue: minimum **75 à 150'/sem.**

+

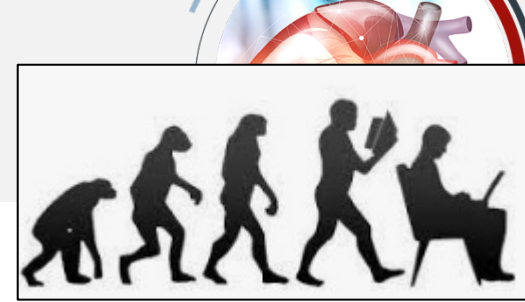
2x/semaine ou davantage des activités de renforcement musculaire

- → solliciter les principaux groupes musculaires → bienfaits + pour la santé

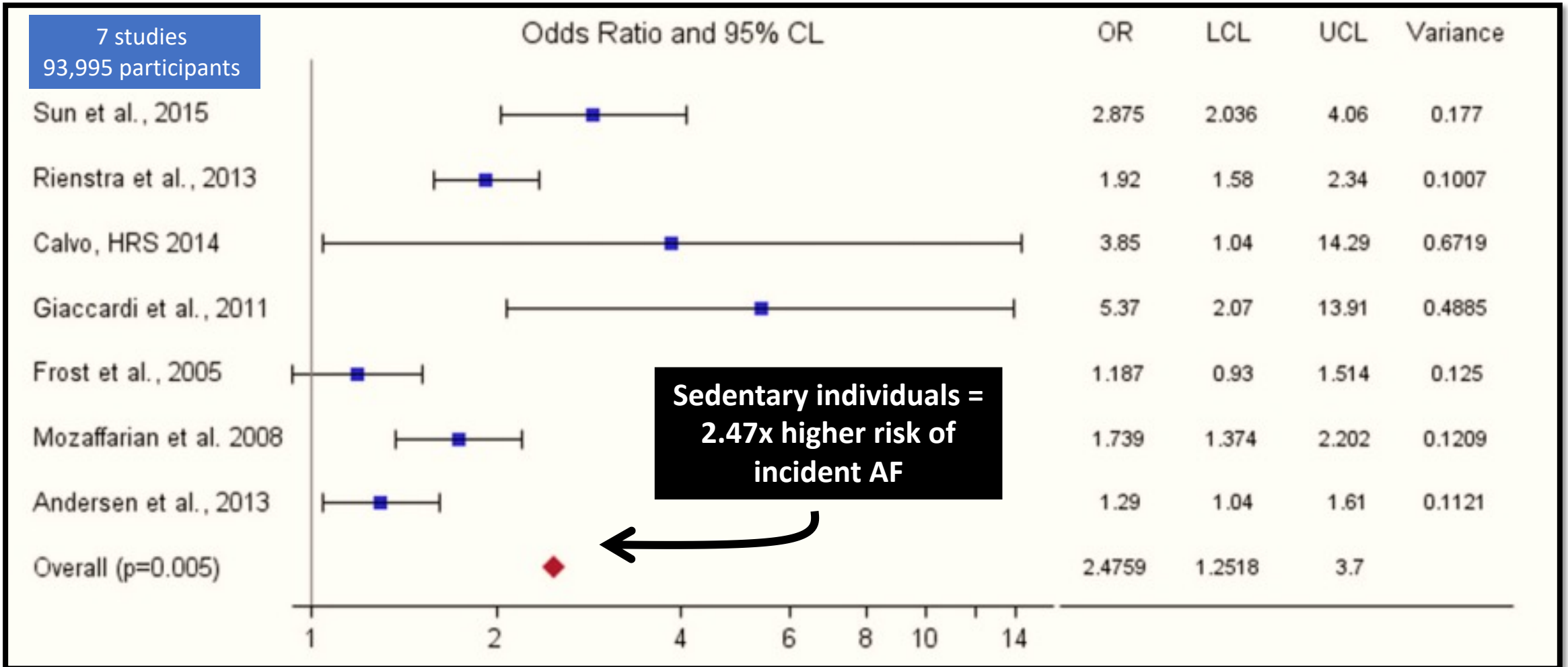
>300'/semaine → ?

- Oui,

...afin d'en retirer des bienfaits supplémentaires pour la santé

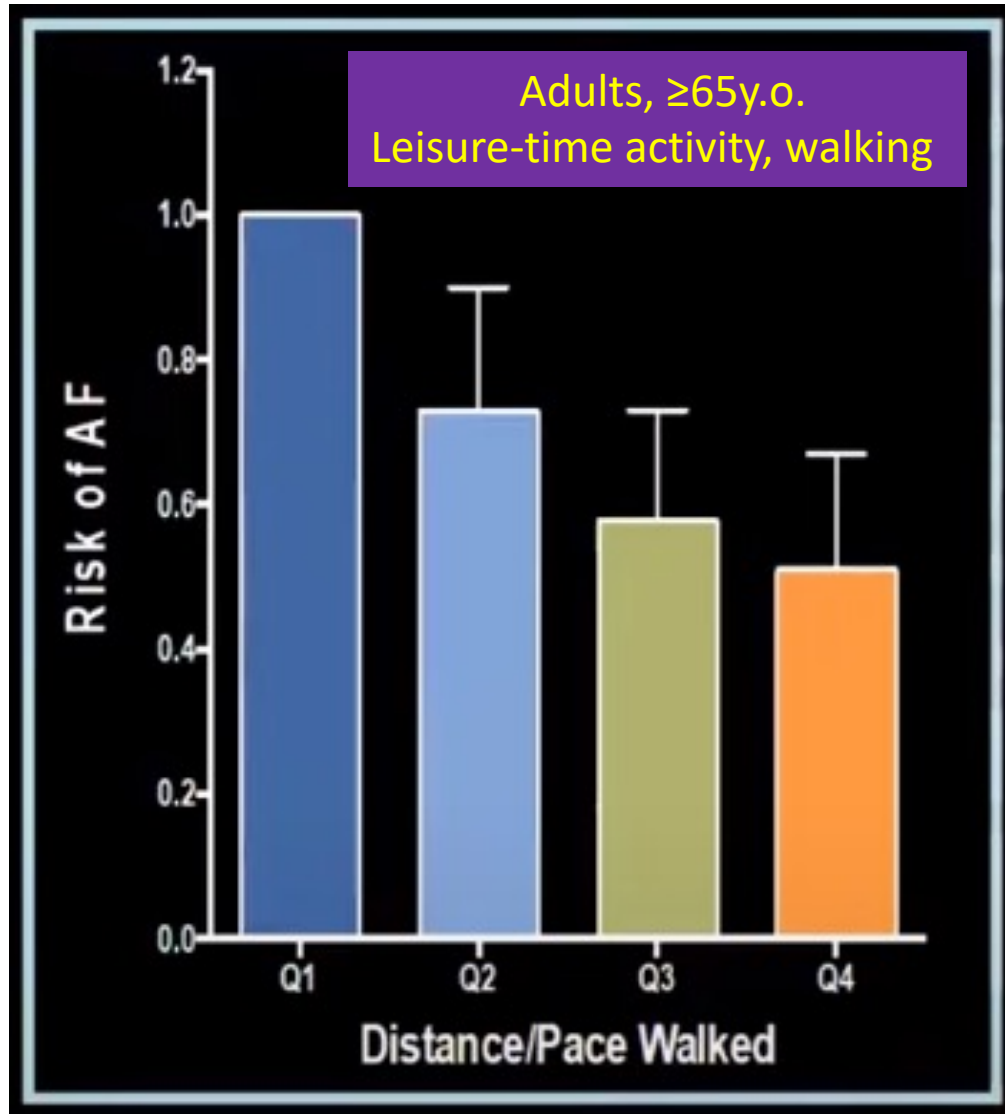


Risques de FA (homme et femme) si sédentaire

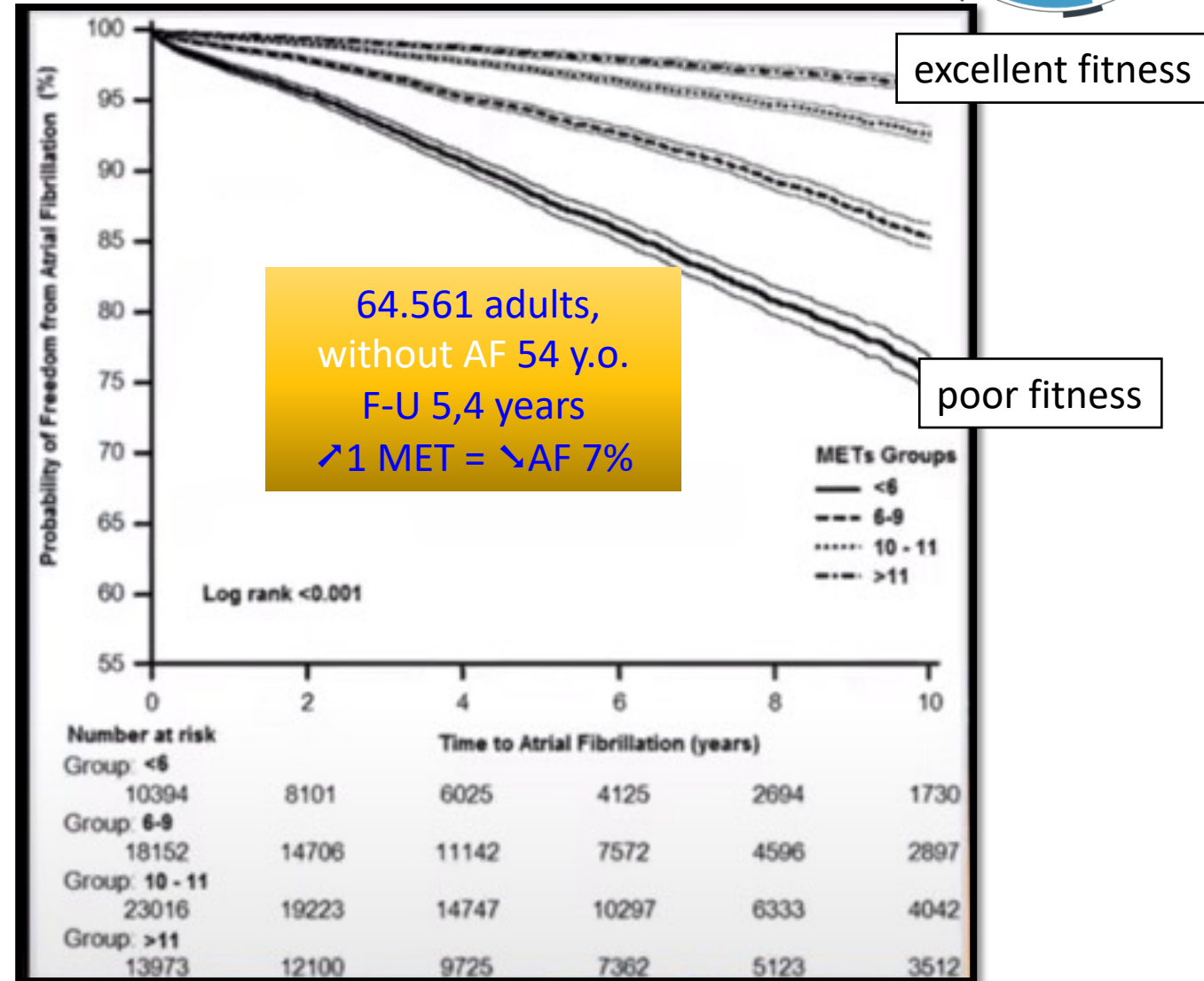


Morbidité cardio-vasculaire dans le sport ?

Fitness, activité physique et FA



Mozaffarian et al. Circulation. 2008;118:800–807

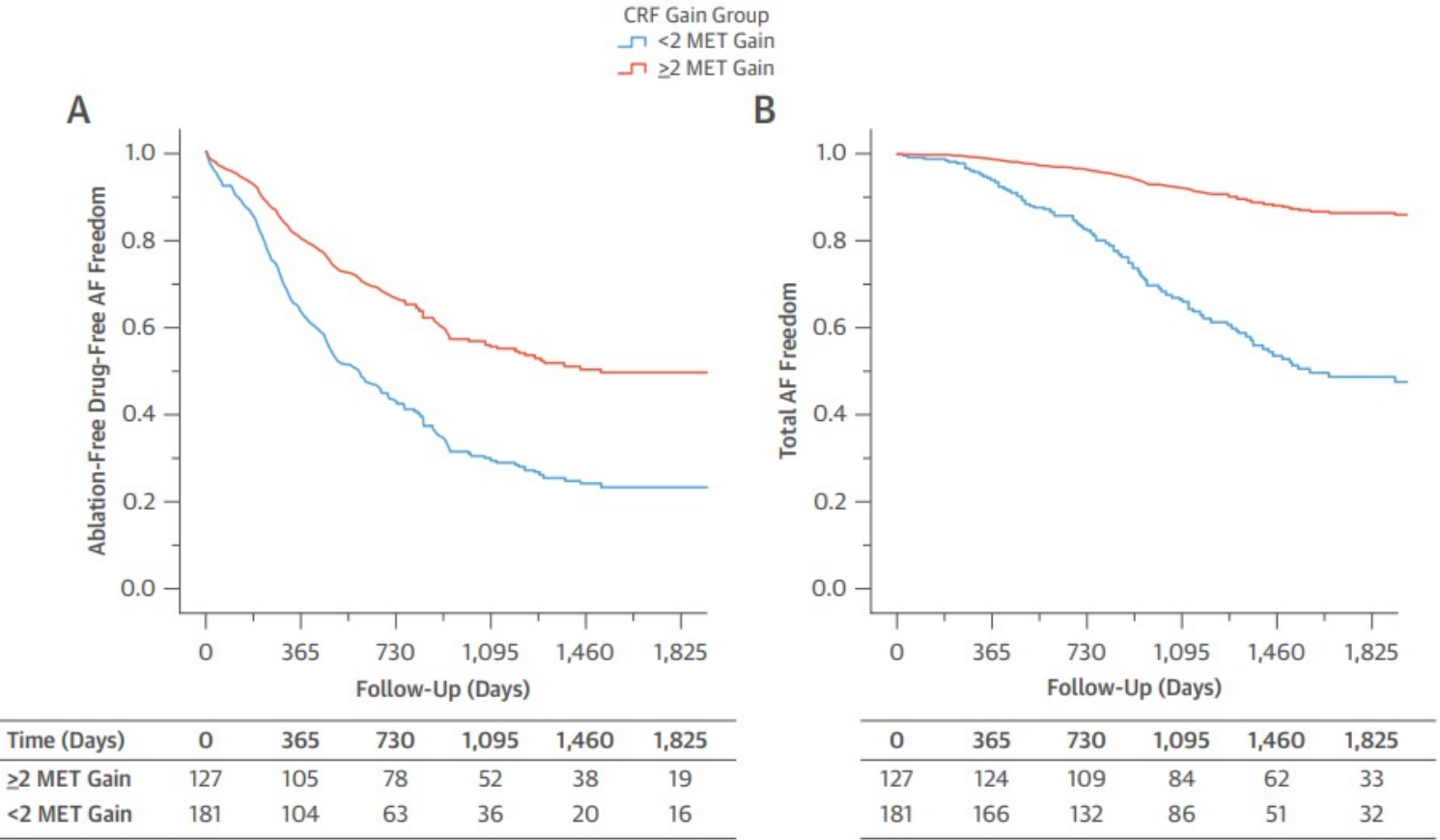


Quershi et al. 2015. Circulation.

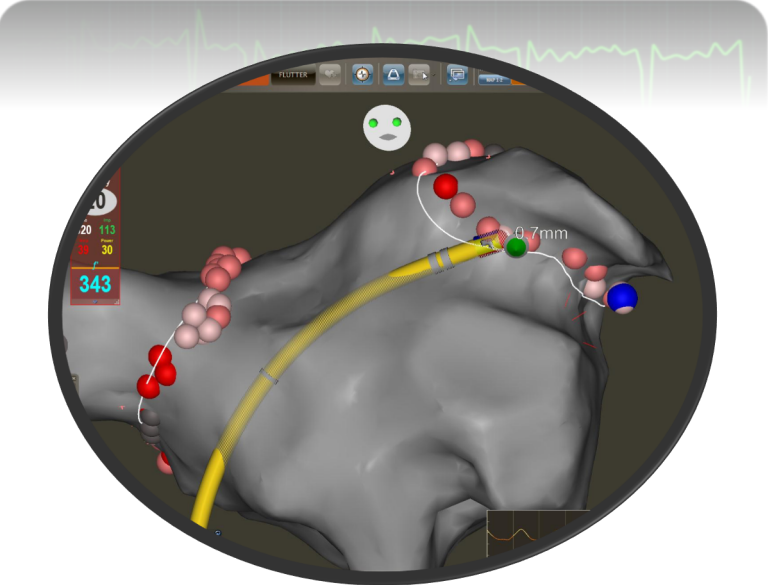
Impact of a Weight Loss on the Burden of AF in Obese Patients
CARDIO-FIT study



FIGURE 3 Outcomes of AF Freedom According to Cardiorespiratory Fitness Gain (<2 METs Gain vs. ≥2 METs Gain)



(A) Kaplan-Meier curve for total AF-free survival (multiple ablation procedures ± drugs) according to weight trend. **(B)** Kaplan-Meier curve for total AF-free survival (multiple ablation procedures ± drugs) according to weight fluctuation. Abbreviations as in [Figure 1](#).





Normal responses to training (endurance)...

- Left atrial dilatation
- Left ventricular dilatation and hypertrophy
- Sinus bradycardia (vagal)
- First-degree atrioventricular block (vagal)
- Second-degree atrioventricular block type I (Wenckebach) - vagal



19h01...François D'Haene

→ *structural changes are at least partly reversible*



- **La FA peut-elle être causée par le sport ?**

The phrase “mhdén ágan” carved into the Temple of Apollo at Delphi.

= “nothing in excess”



*One belief was that **a healthy life** is achieved by following the principle of moderation.*



Christian Eriksen



The U-shaped relationship between exercise and cardiac morbidity

Ahmed Merghani, Aneil Malhotra, and Sanjay Sharma*

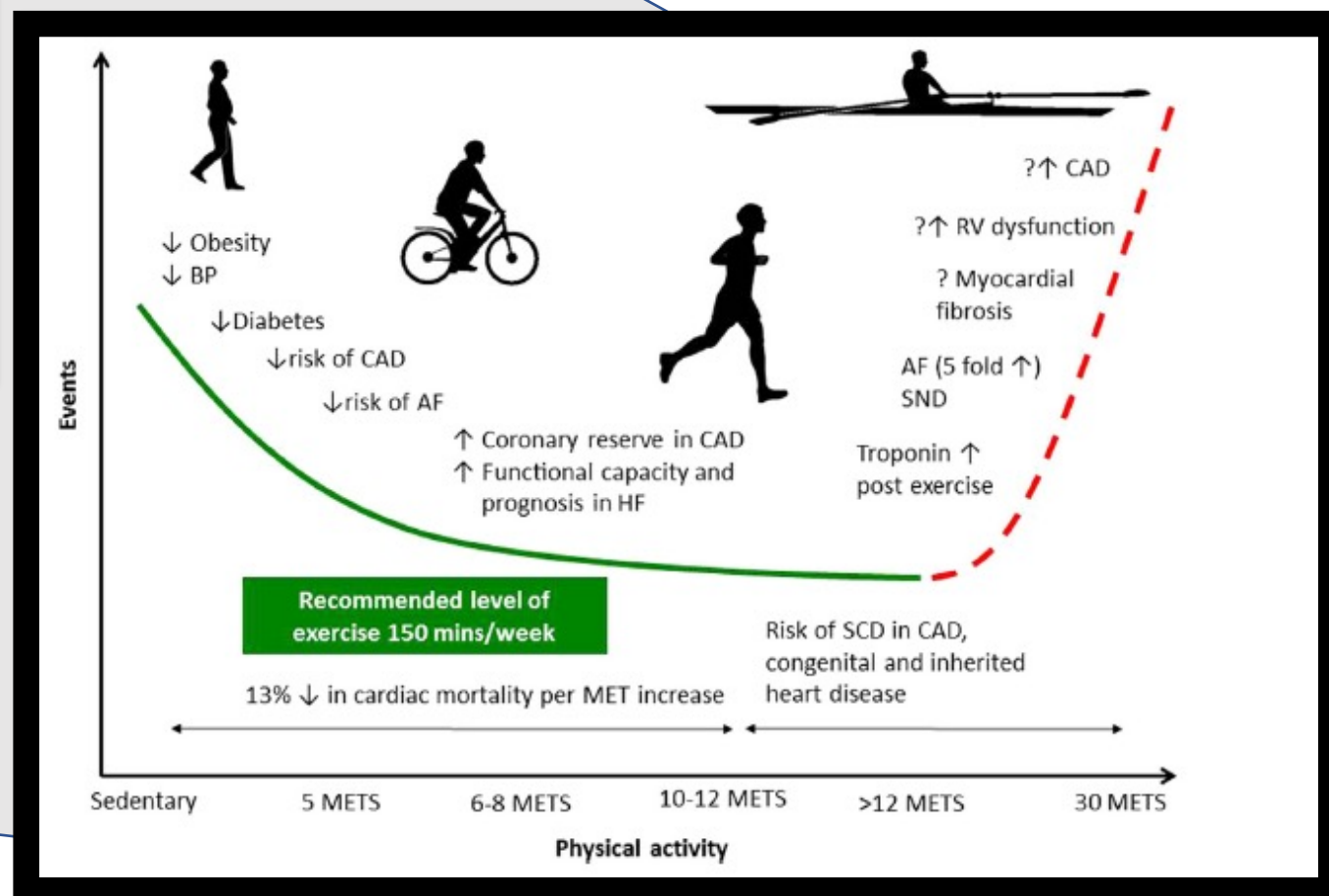
Department of Cardiovascular Sciences, St George's, University of London, Cranmer Terrace, London SW17 0RE, UK

ABSTRACT

Exercise confers a plethora of health benefits that are well documented, whereas physical inactivity is a leading risk factor for cardiovascular morbidity and mortality. The dose of physical activity required to achieve these benefits is relatively modest and equates to jogging at a pace of 15 min per mile for 20-30 min daily. In the current era, most athletes engage in a volume and intensity of exercise that is at least 5-10-fold greater than the general recommendations for physical activity. Such practice is evidenced by the fact that many sportsmen have achieved athletic feats that were considered impossible only 2 decades ago. Numerous studies in retired athletes have consistently shown a reduced incidence of heart disease and an increased longevity of life. Occasionally, however, intense exercise is associated with sudden deaths in athletes harboring quiescent yet potentially sinister cardiac diseases. Despite the visibility afforded by such catastrophes, the reputation of exercise remains unscathed because most deaths can be accounted for by an underlying cardiac abnormality where exercise is a mere trigger for a fatal arrhythmia rather than the actual cause of death. More recently, there have been an emerging number of reports suggesting that intense exercise may have an adverse impact on an otherwise normal heart. This article will review the morbidity and mortality associated with sport and pose the question whether one can have "too much of a good thing."

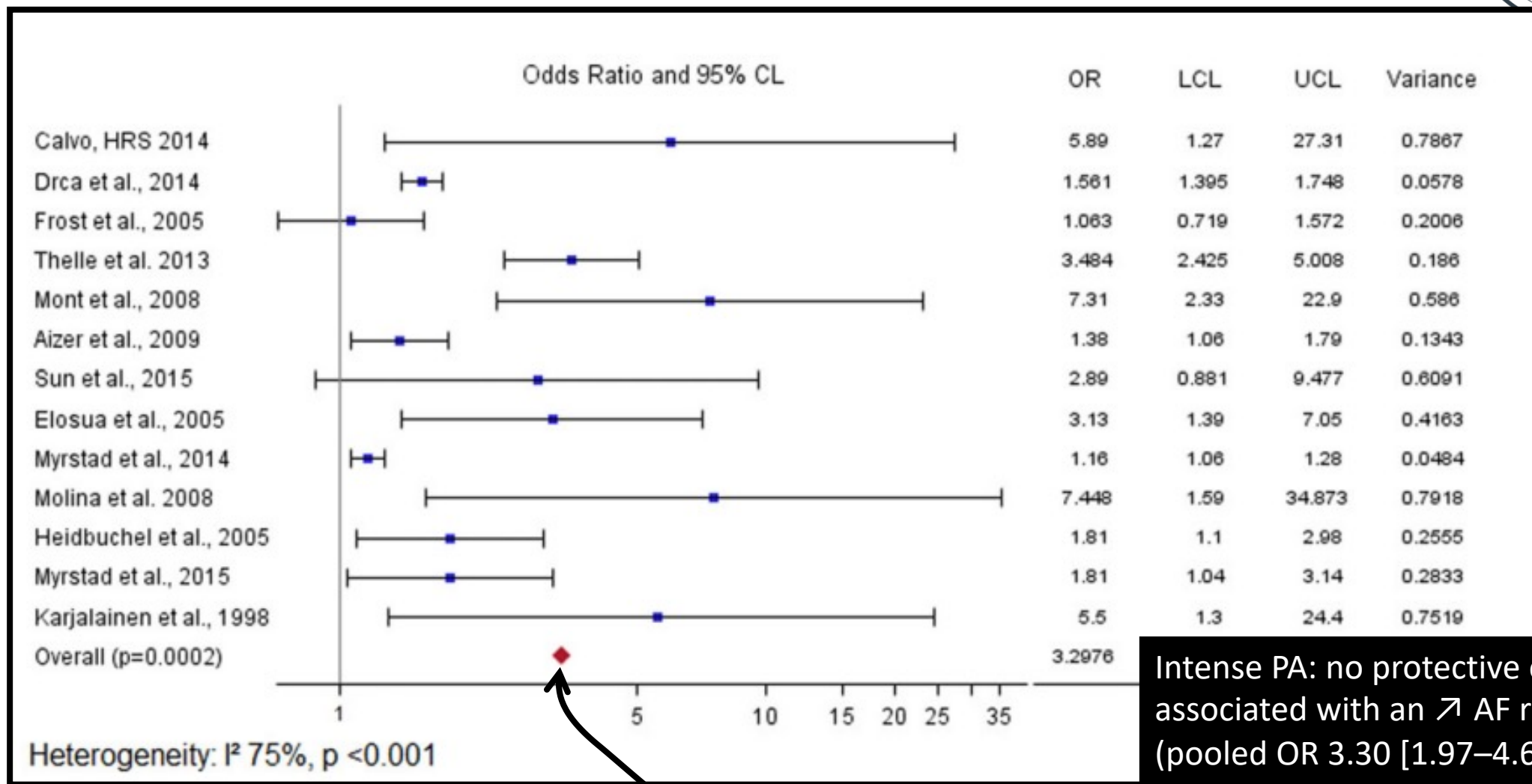
Keywords: Athlete's Heart, sports cardiology, veteran athlete, atrial fibrillation, myocardial fibrosis, sudden cardiac death, cardiomyopathy.

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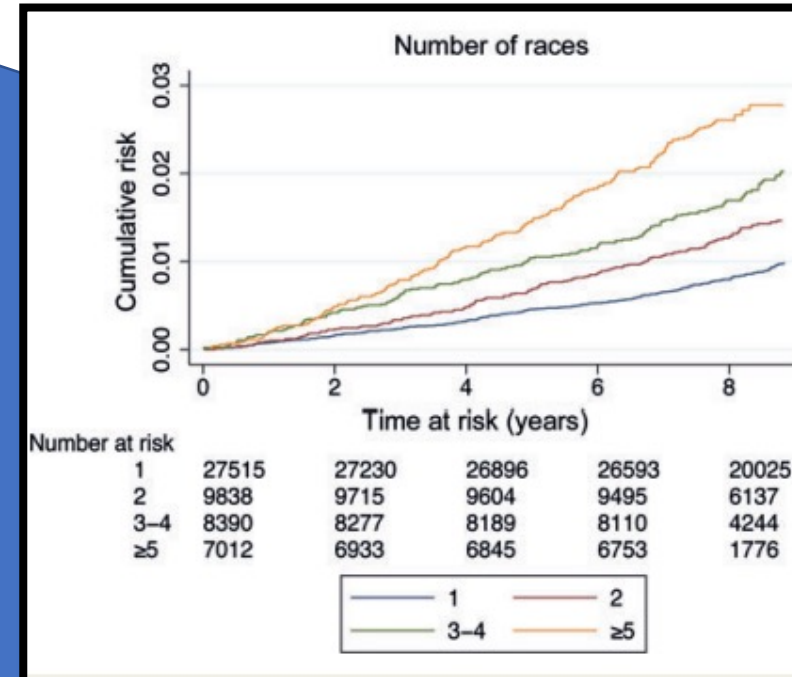
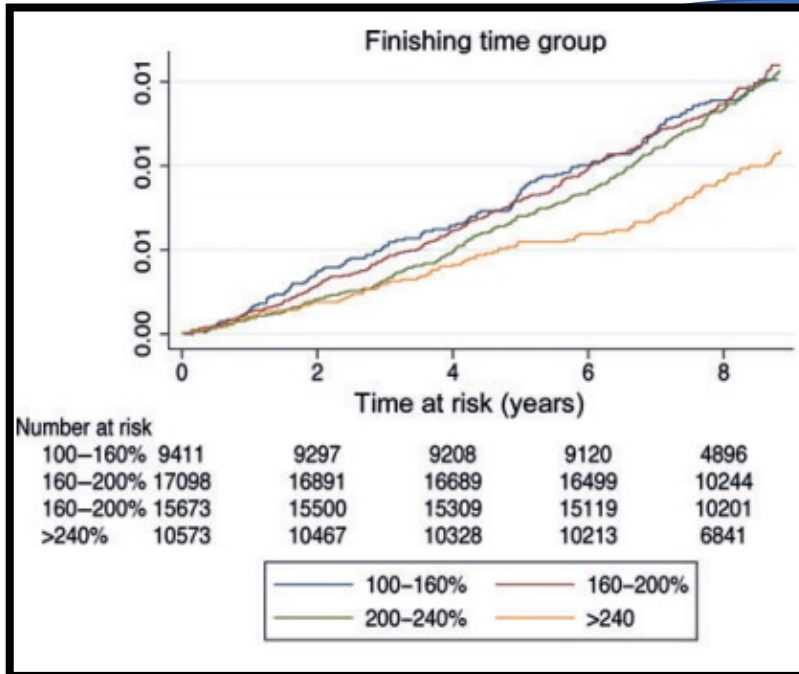
Risk of incident atrial fibrillation

Men with Intense Physical Activity



Intense PA: no protective effect; but associated with an $\nearrow$ AF risk (pooled OR 3.30 [1.97–4.63], $P = 0.0002$)

Cumulative incidence of any arrhythmia

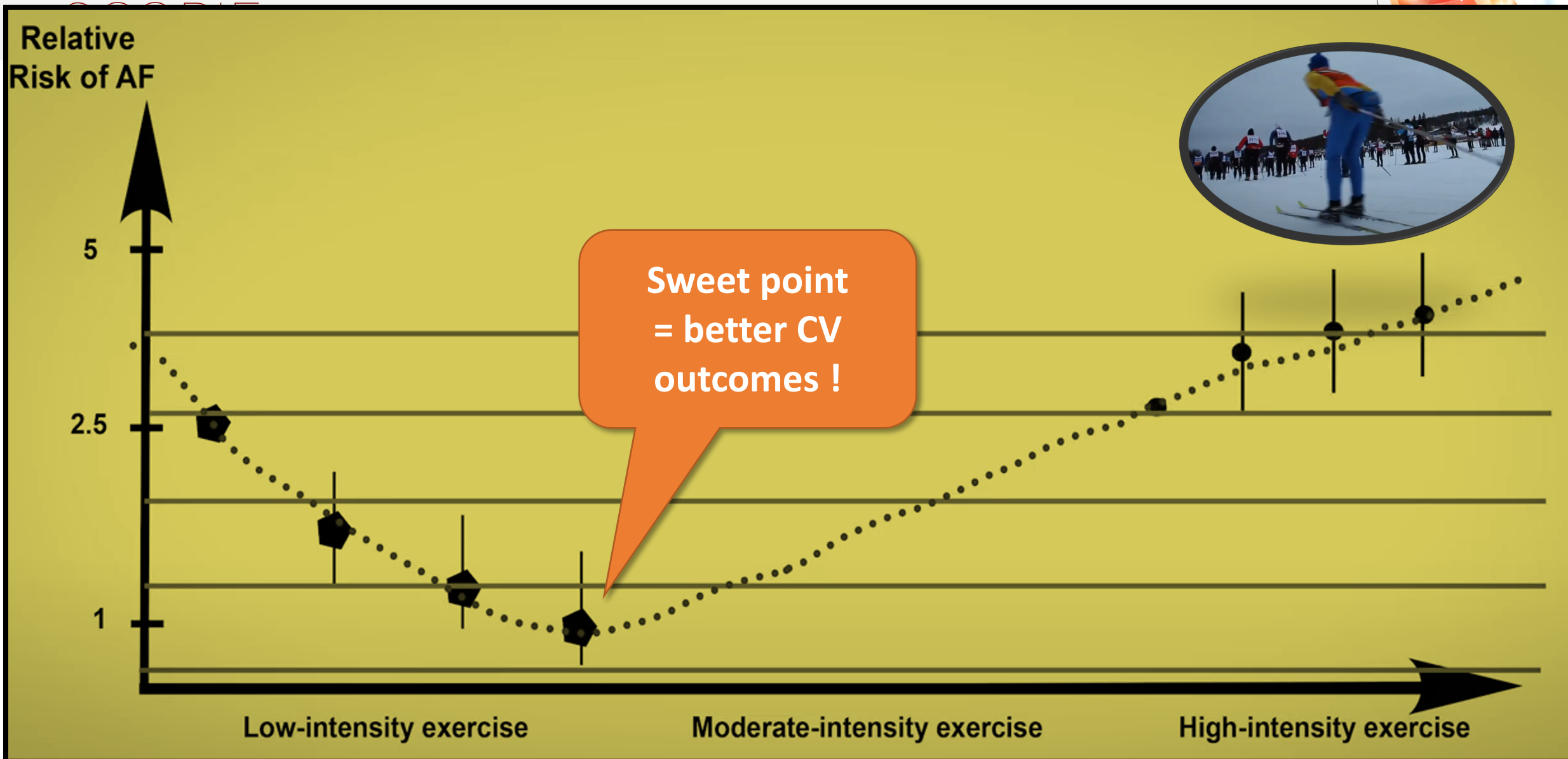
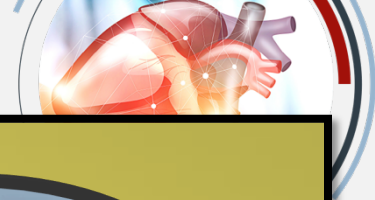


Atrial fibrillation (n = 681, PYAR = 514 550)

> 240%	1.00 (ref.)
200-240%	1.02 (0.82-1.28)
160-200%	0.98 (0.79-1.22)
100-160%	1.20 (0.93-1.55)
Per category	1.04 (0.96-1.13)

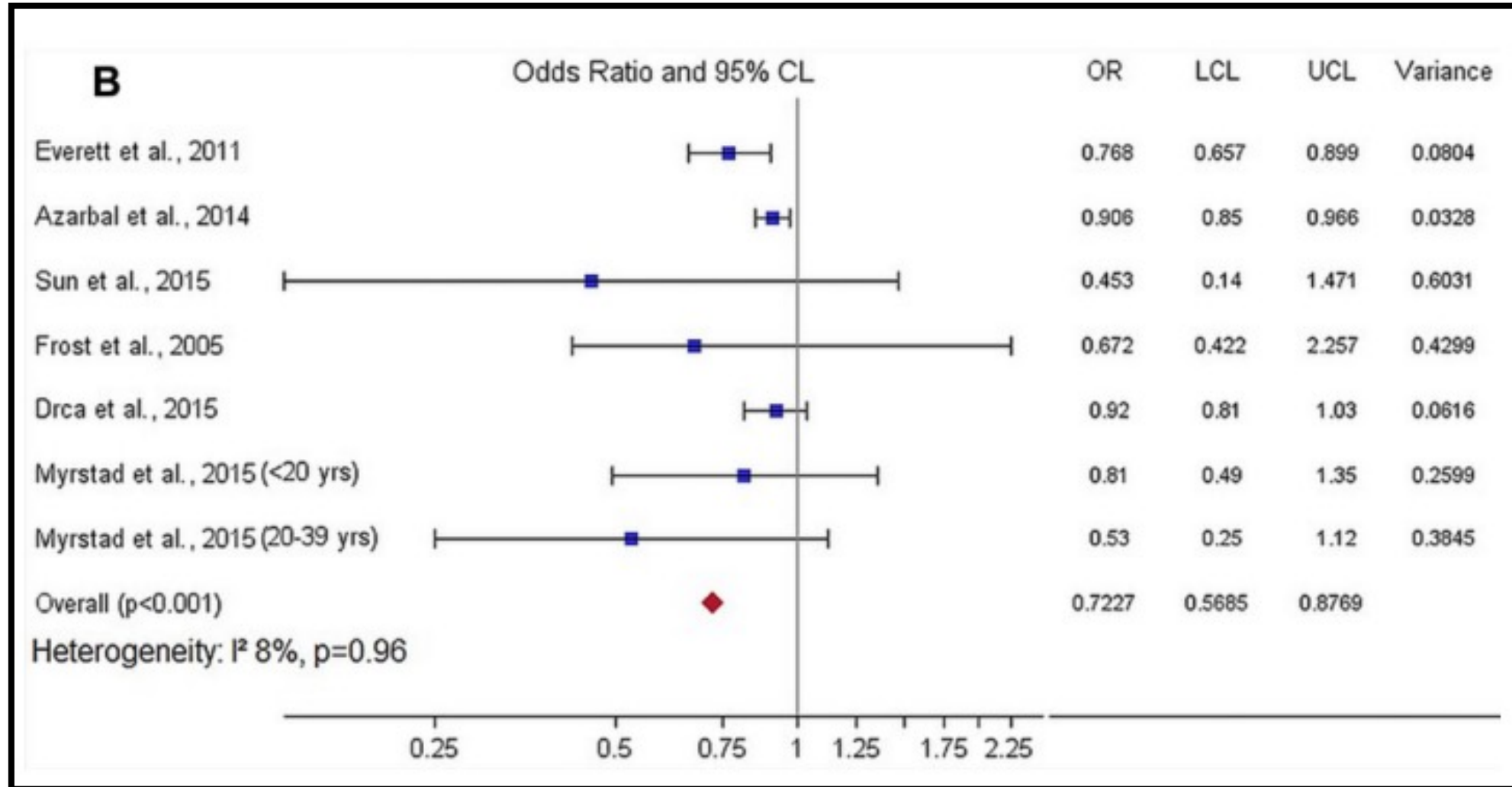
Atrial fibrillation (n = 681, PYAR = 514 550)

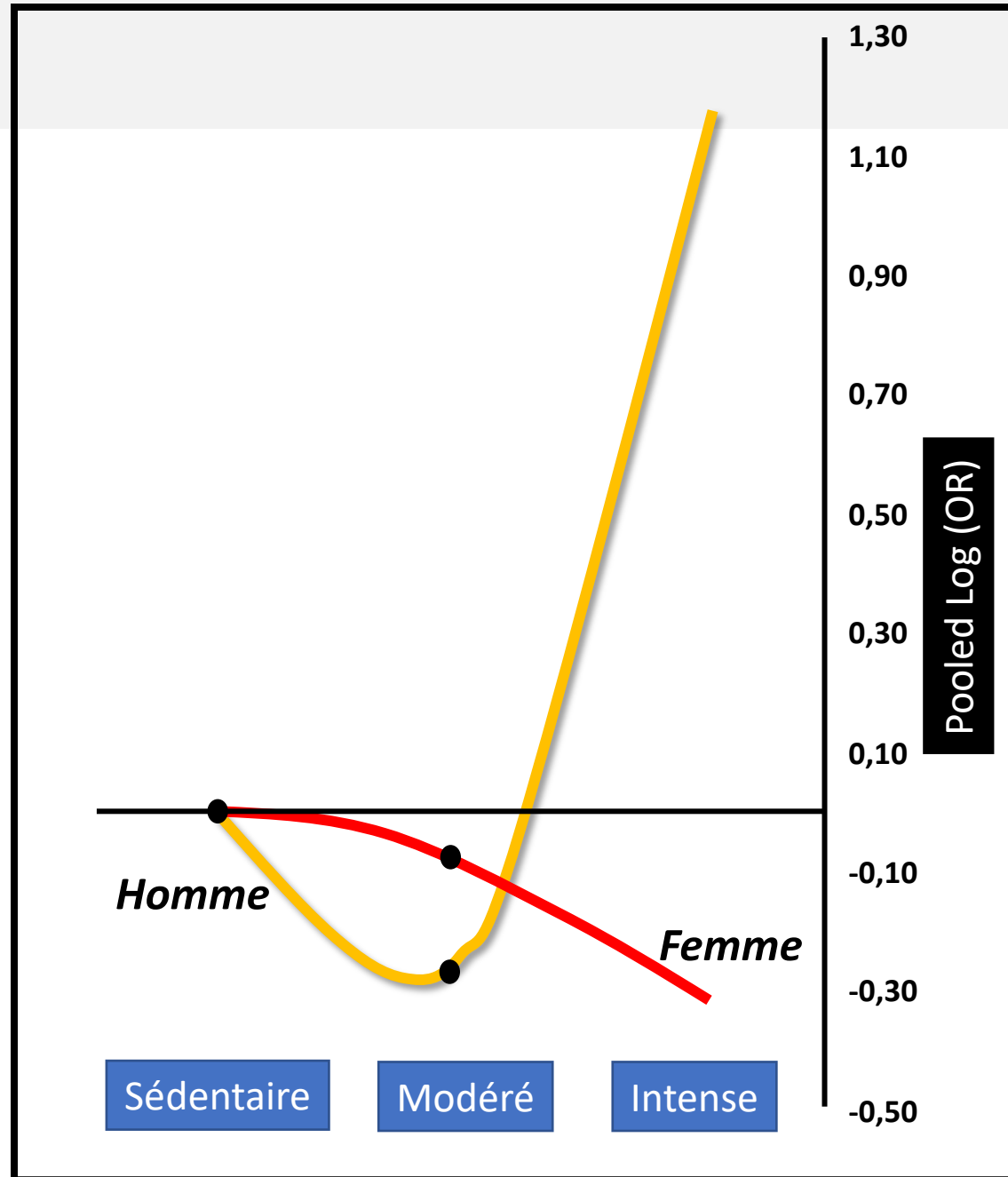
1	1.00 (ref.)
2	1.22 (0.99-1.51)
3-4	1.27 (1.02-1.57)
≥5	1.29 (1.04-1.61)
Per category	1.09 (1.02-1.17)



Risk of incident atrial fibrillation

Women with Intense Physical Activity







- *Retrospective study*
- *51 males with AF*
- *Sports: 3 hours/w. for 2 years*

Clinical characteristics of male patients

Sportsmen n=32 (63%) vs Non-sportsmen n=19 (37%)



Paroxysmal 22 (69%) vs 12 (63%)

Persistent 7 (22%) vs 7 (37%)

Permanent 3 (9%) vs 0



Vagal AF 17 (57%) vs 3 (18%) <0.01



Caractéristiques cliniques des sujets sportifs avec de la FA

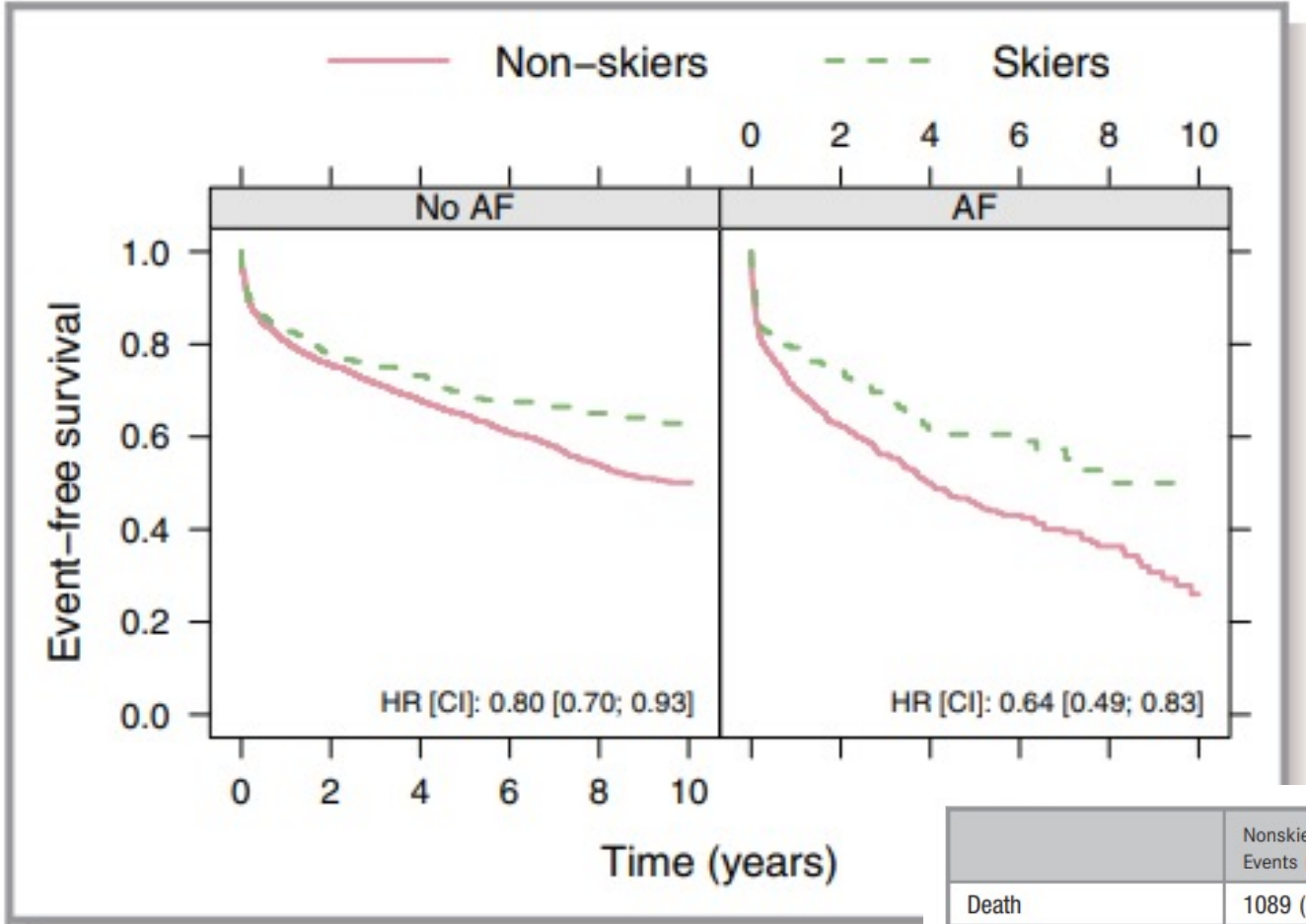
- *Hommes 9x/10*
- *Age: 40-50 ans*
- *Sport: d'endurance, intense durant de nombreuses années*
- *Type de FA: paroxystique*
- *Déclencheur: vagal*

Facteurs favorisants

1. *Intensité de la pratique*
2. *Taille de l'individu*
3. *Taille de l'oreillette gauche*
4. *Fonction du ventricule gauche*



“It is generally believed that embolic ischemic stroke associated with AF is more severe and more often fatal, and survivors are left more disabled than patients with other causes of stroke”



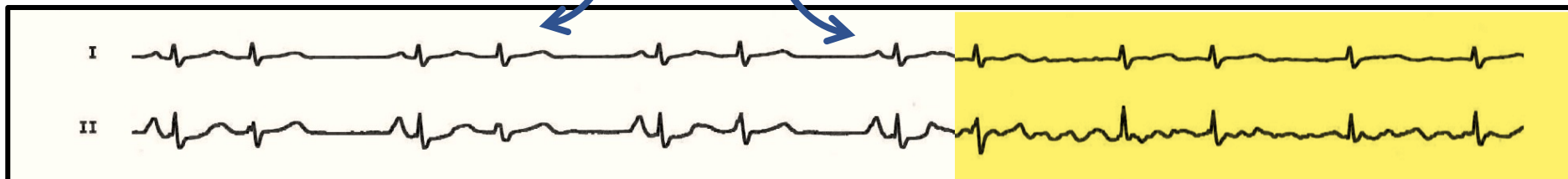
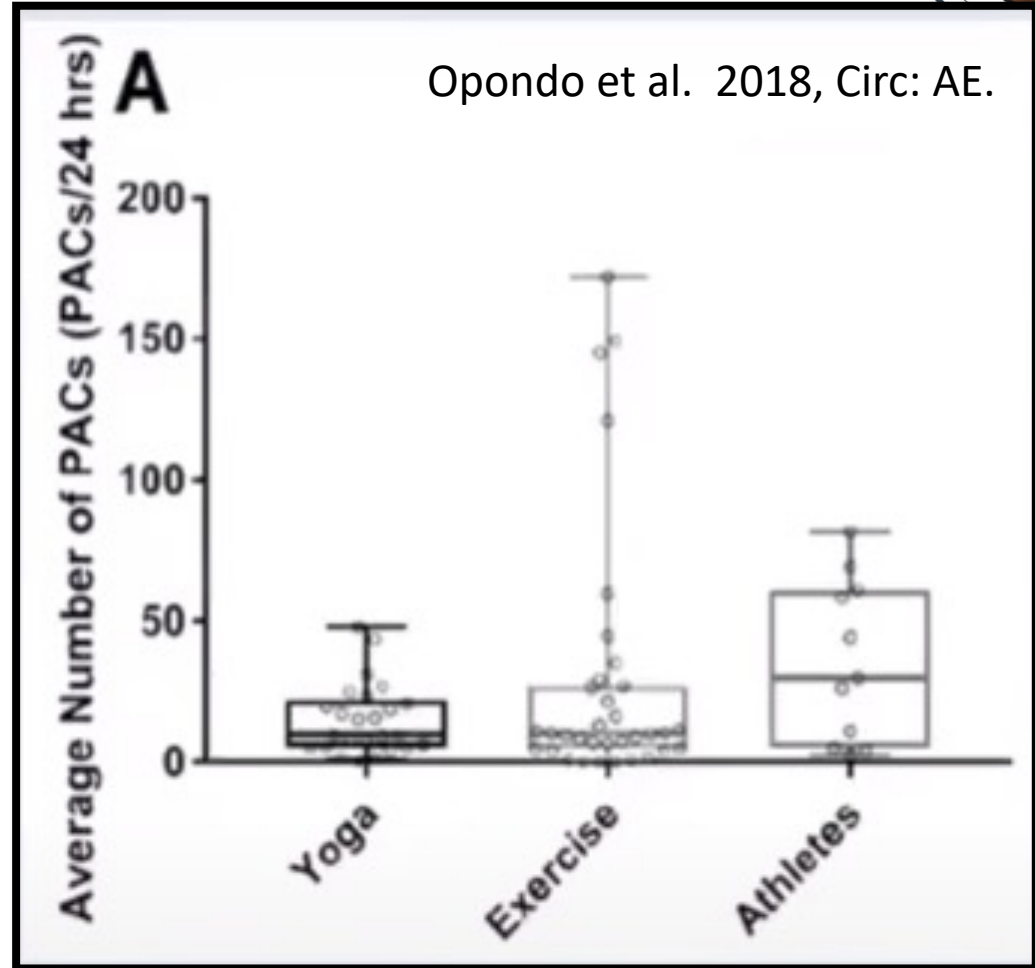
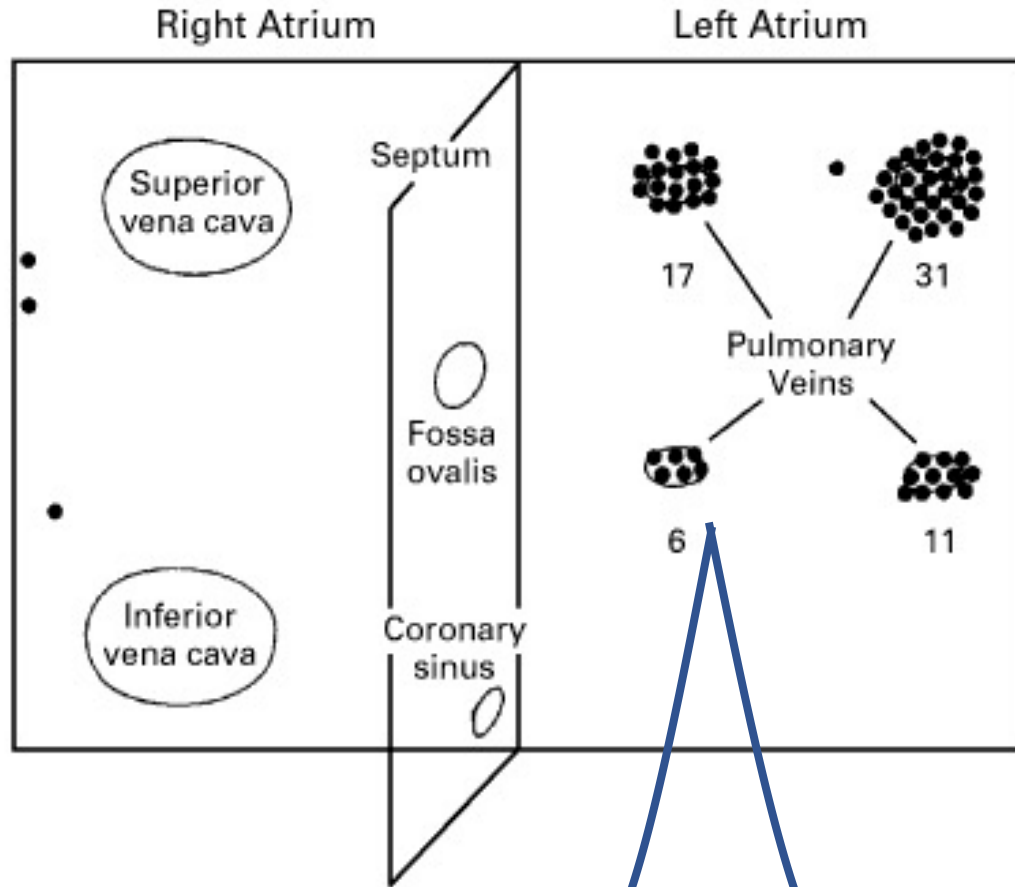
Participants of the Vasaloppet
(world’s largest ski-race)

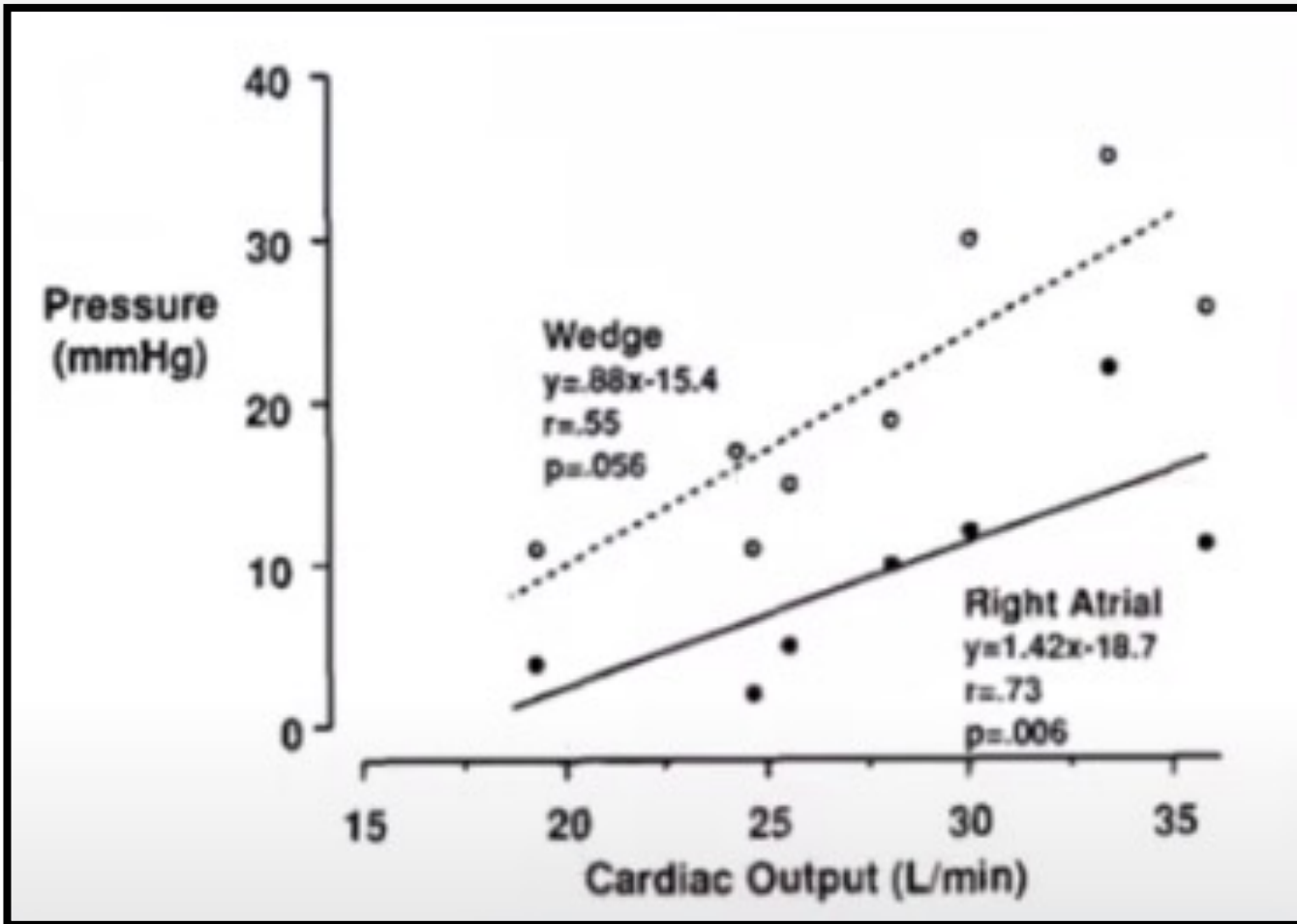
“The skiers had a higher incidence of AF but still
no increased risk of recurring stroke”.

29% relative risk reduction of all-cause death

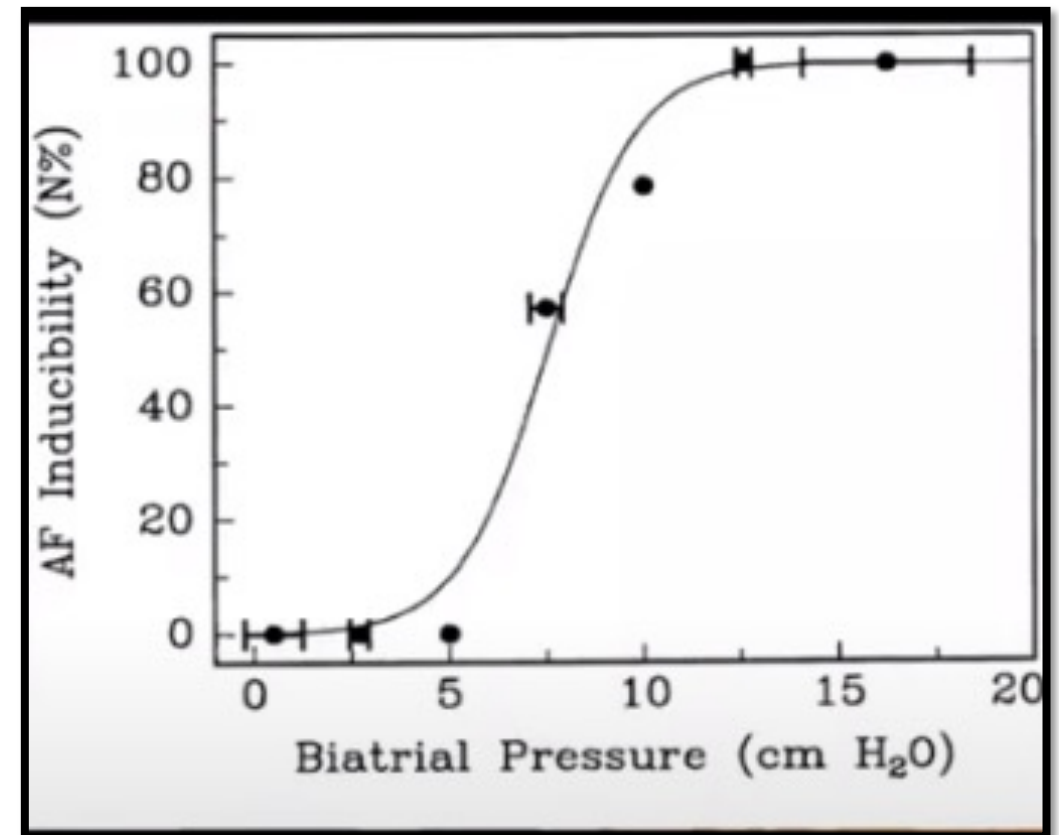
	Nonskiers Events (%/py*)	Skiers Events (%/py*)	HR [95% CI]	Adj HR [†] [95% CI]	Adj HR [‡] [95% CI]
Death	1089 (5.8)	163 (3.8)	0.66 [0.56, 0.78]	0.71 [0.57, 0.88]	0.70 [0.56, 0.87]
Death/re-stroke	1744 (11.1)	303 (8.3)	0.76 [0.67, 0.86]	0.86 [0.74, 1.00]	0.88 [0.75, 1.03]
Death/re-stroke/MI	1825 (11.9)	323 (9.0)	0.77 [0.69, 0.87]	0.88 [0.76, 1.02]	0.91 [0.78, 1.05]
Re-stroke	941 (6.0)	177 (4.8)	0.82 [0.70, 0.96]	0.96 [0.79, 1.17]	1.02 [0.84, 1.24]
MI	261 (1.4)	203 (1.0)	0.69 [0.50, 0.96]	0.74 [0.47, 1.15]	0.85 [0.54, 1.33]
Re-stroke/MI	1086 (7.1)	177 (5.6)	0.81 [0.70, 0.94]	0.95 [0.79, 1.14]	1.02 [0.85, 1.23]

Extrasystoles chez l'athlète





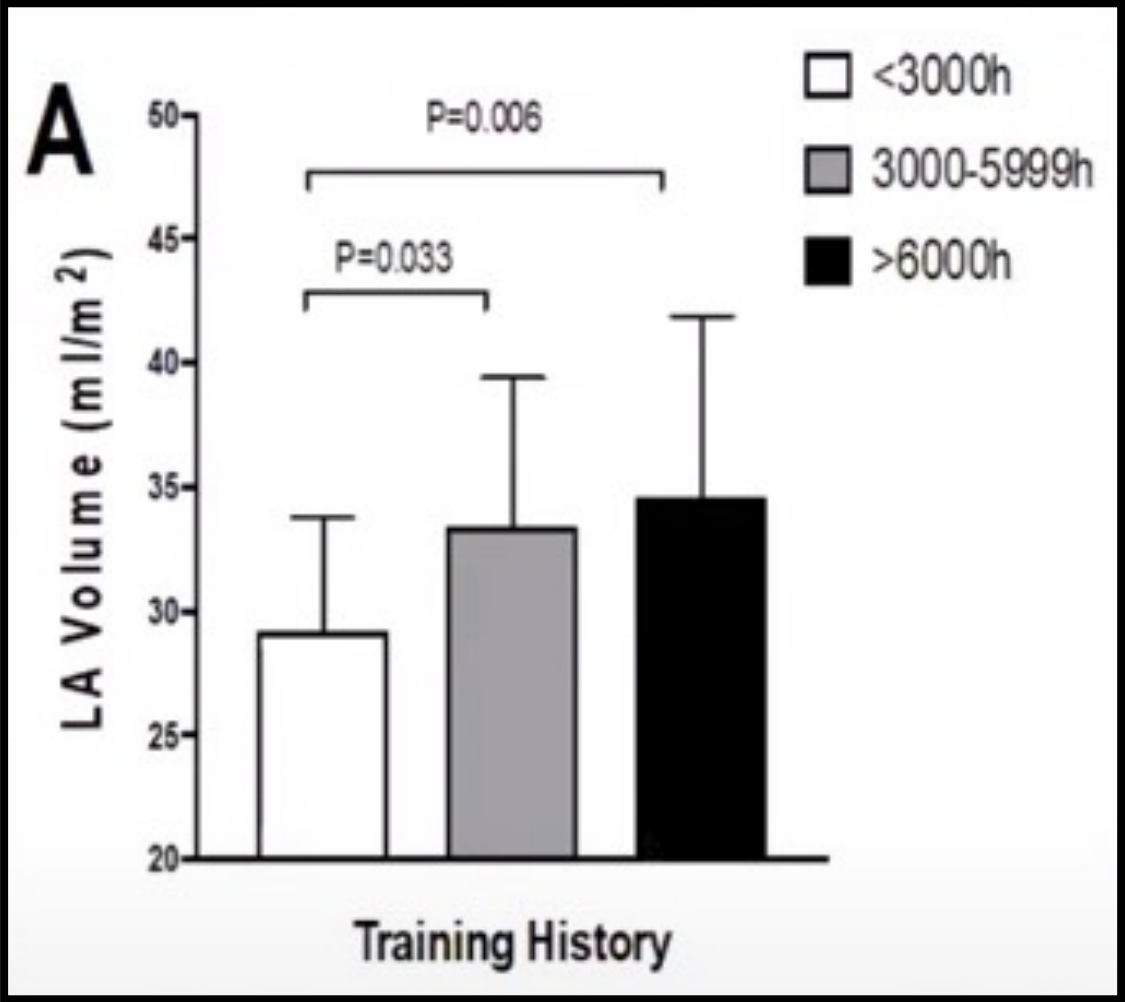
Reeves et al. 1990, Respi Physiol.



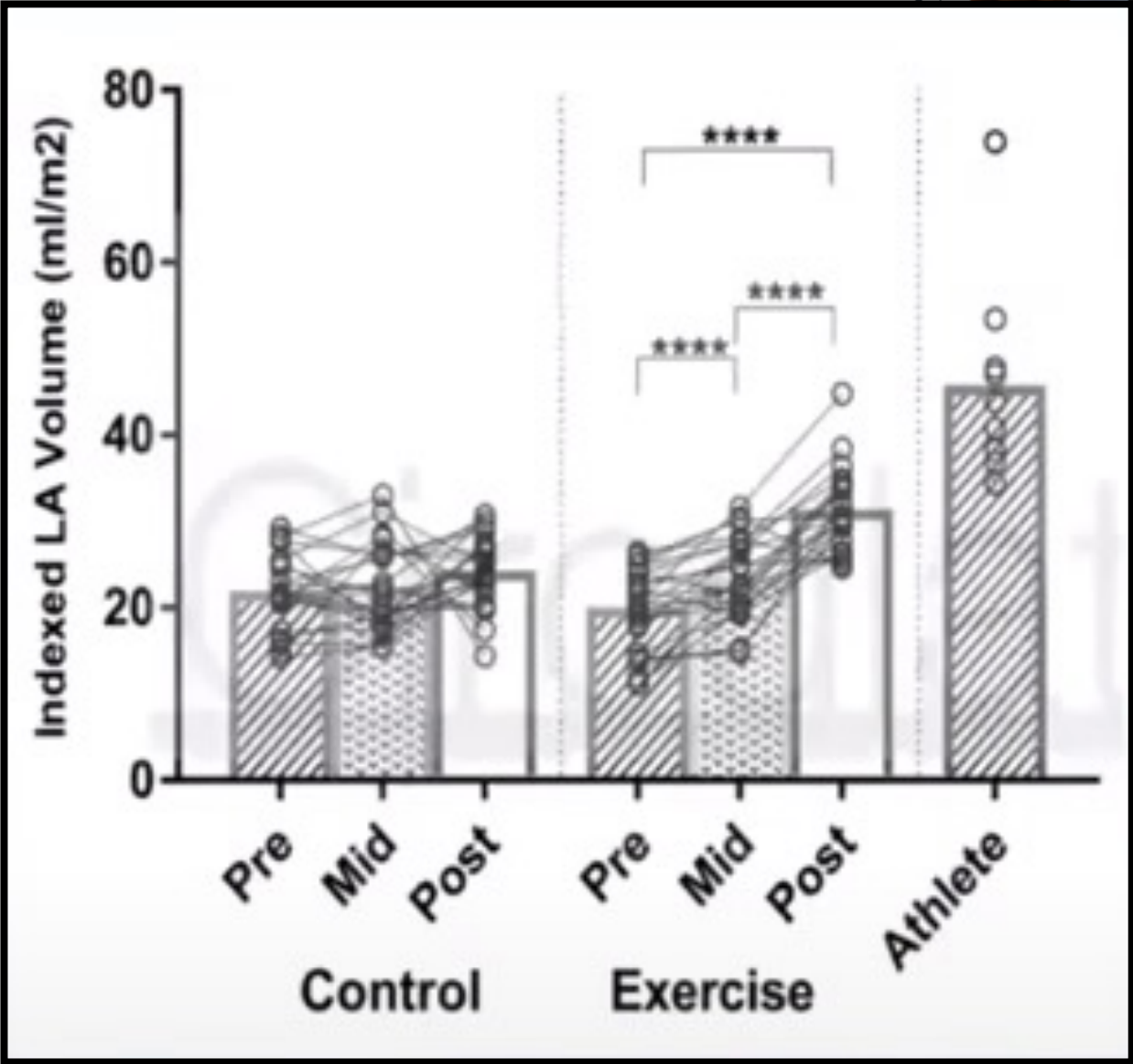
Ravelli et al. Circulation 1997.



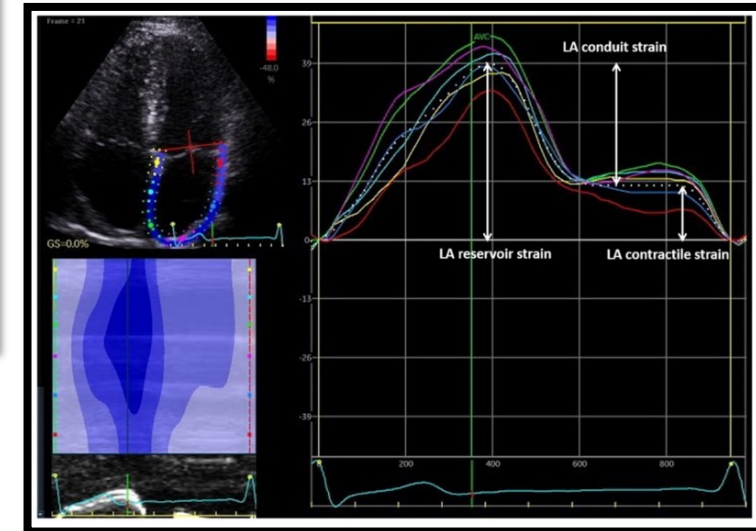
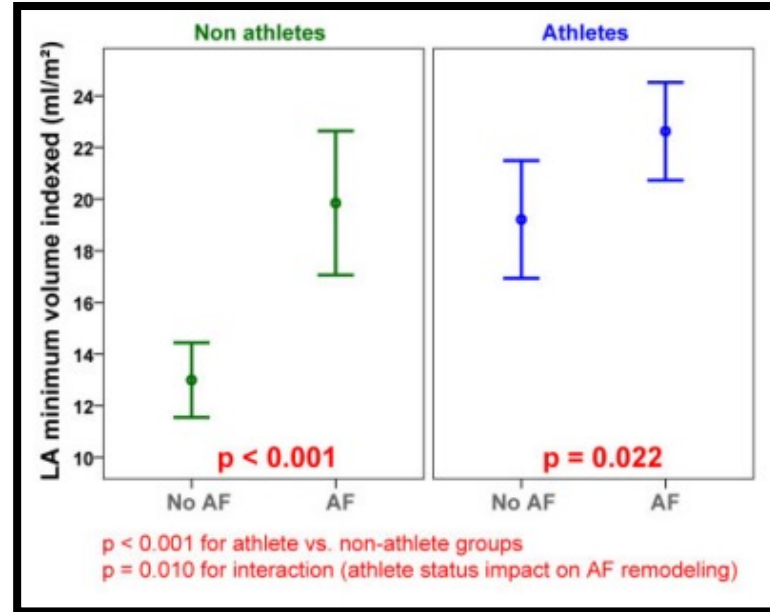
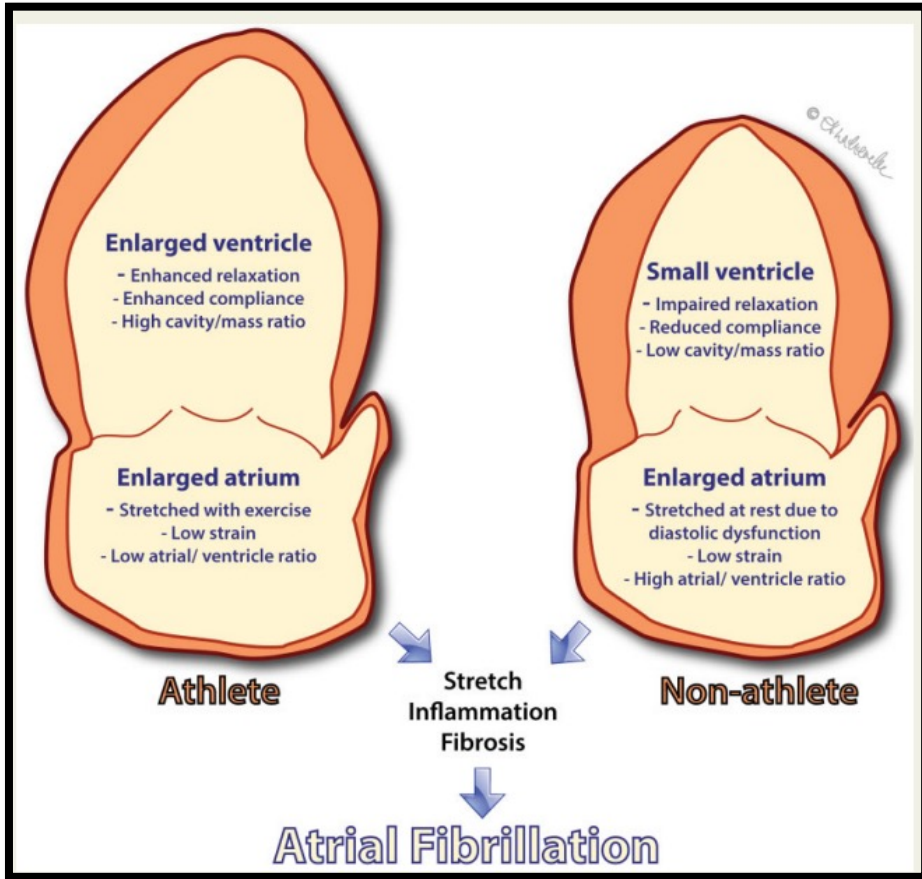
99 recreational endurance athletes - ± 55 y.o.



Elliott et al. 2018. Clin Cardiol. <https://doi.org/10.1002/clc.22967>

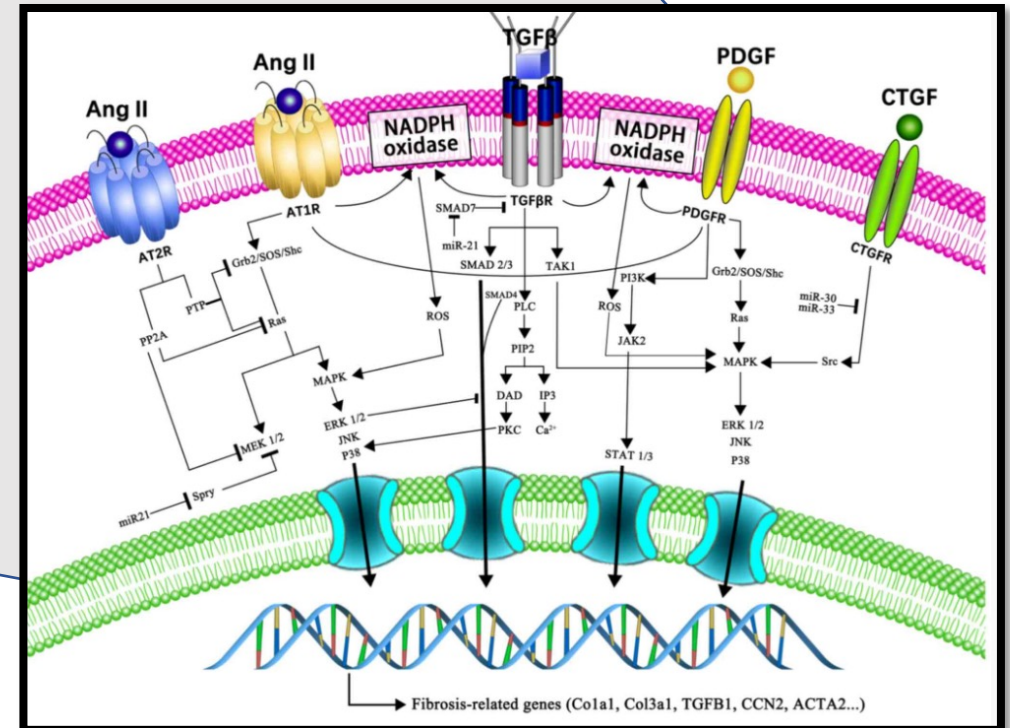


McNamara et al (2018; Circulation)



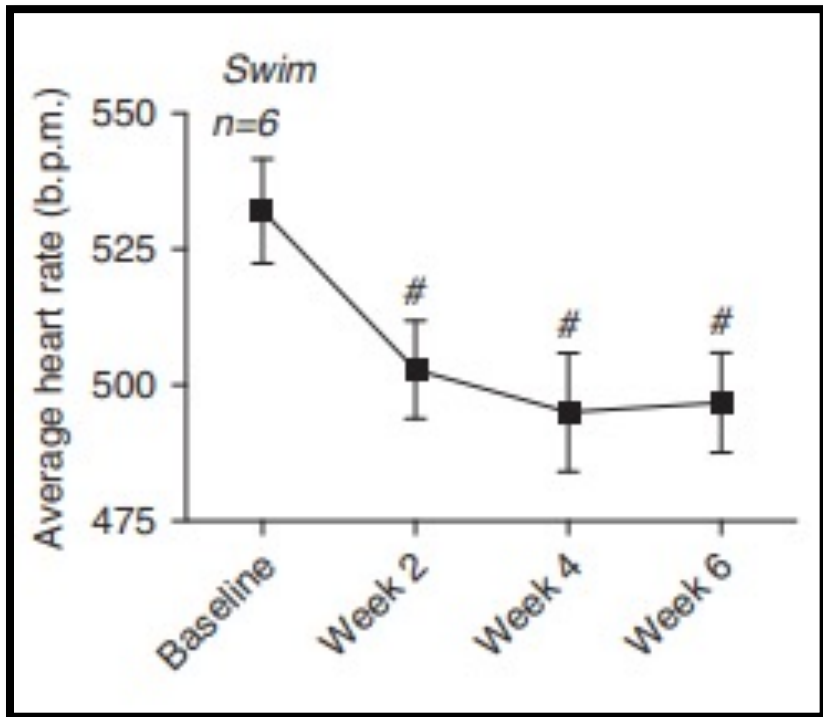
Athletes, including those with AF, have normal diastolic parameters, with atrial enlargement proportional to LV remodelling

- Excessive synthesis and irregular deposition of extracellular matrix

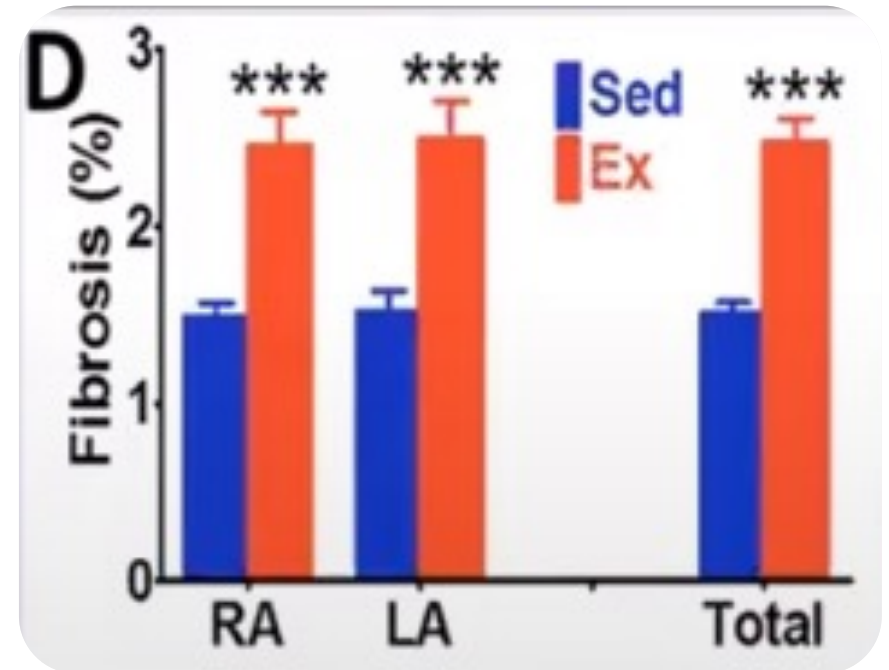
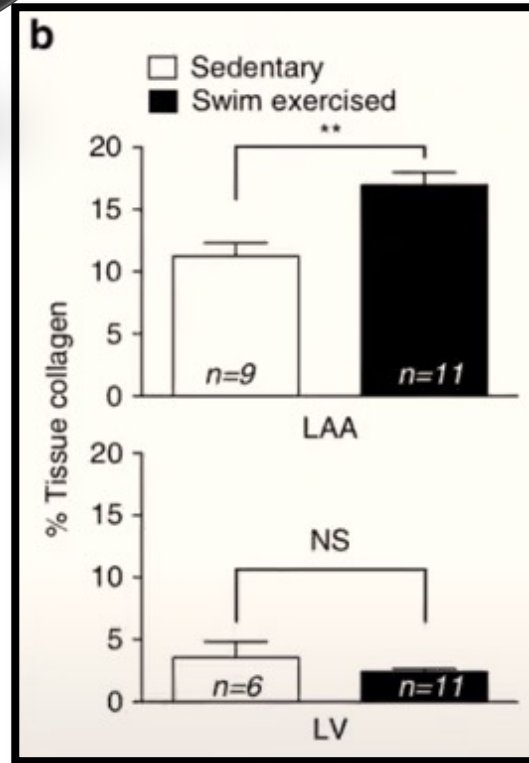




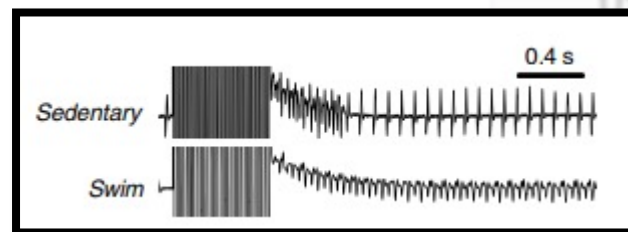
Fibrose de l'oreillette chez des souris « sportives »

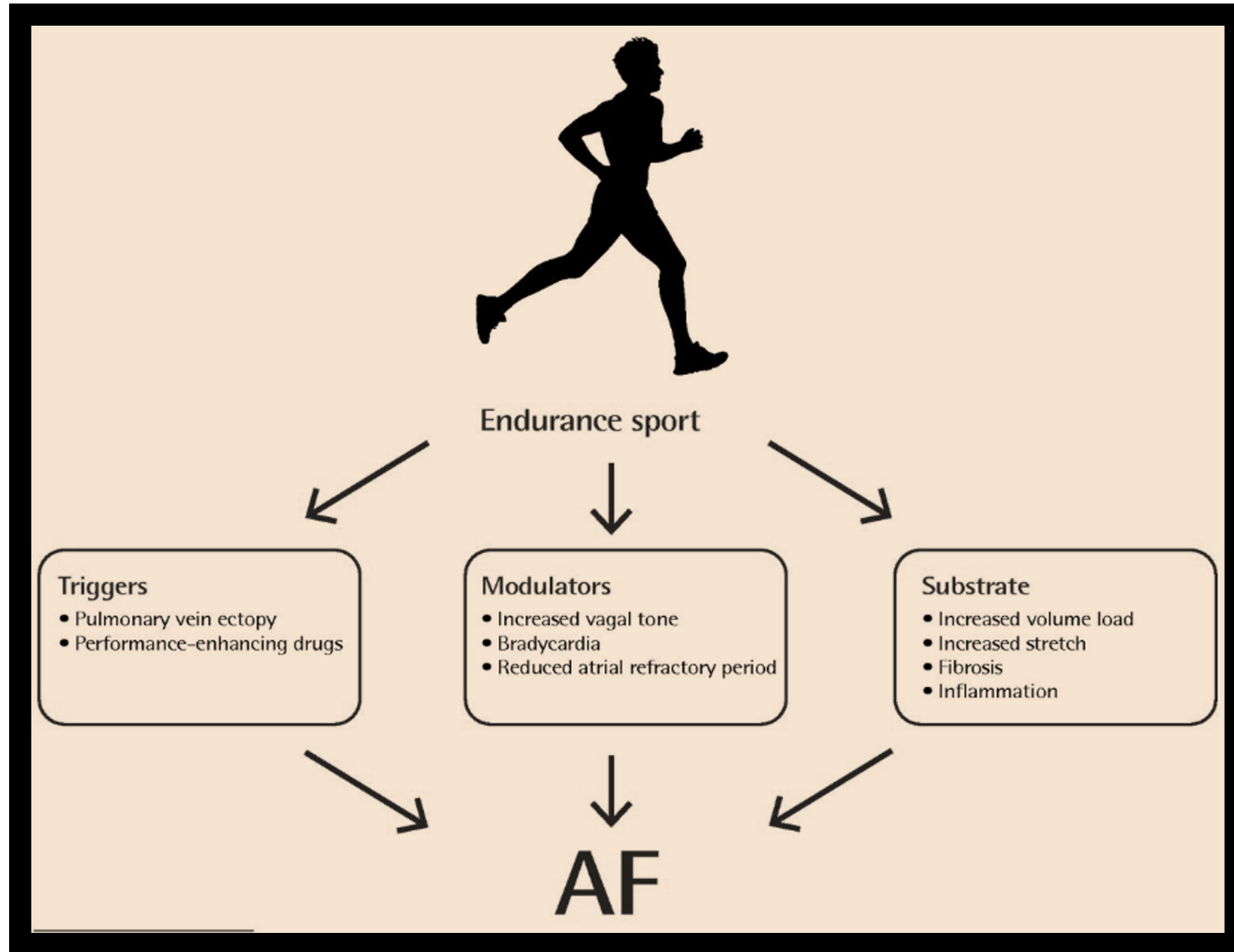


Aschar Sobbi et al. 2015, Nat Comm



Guasch et al. JACC 2015.







Bilan

- ECG → *brady, bloc AV, HVG, WPW, ...*
- Echographie cardiaque → *fonction ? HVG ? Valvulopathie ?*
- Epreuve d'effort → *coronaropathie ?*
- Holter → *FA focale, flutter ? ESA (P/T) ?*
- Biologie: → *TSH, ionogramme*
- IRM ? → *fibrose*
- Génétique → *Syndrome de Brugada, CMPH, CMPD, CPVT ont une ↗ risques de FA*



Produits → FA

- *Hormones de croissance*
- *Stimulants – caféine – RedBull*
- *Amphétamines*
- *Drogues: cocaine, ecstasy*
- *Diurétiques*



Prise en charge thérapeutique et disqualification

Recommandation

- Peu de crises de FA, bien supportées, bilan (-)
 - **Participation autorisées à tous les sports, y compris la compétition**
- Si nécessité d'une anticoagulation (*selon le CHA2DS2-VASc*)
 - **Considérer les risques de saignement**
- Si une canalopathie est suspectée: **tous les sports de compétition sont interdits** (jusqu'au bilan)



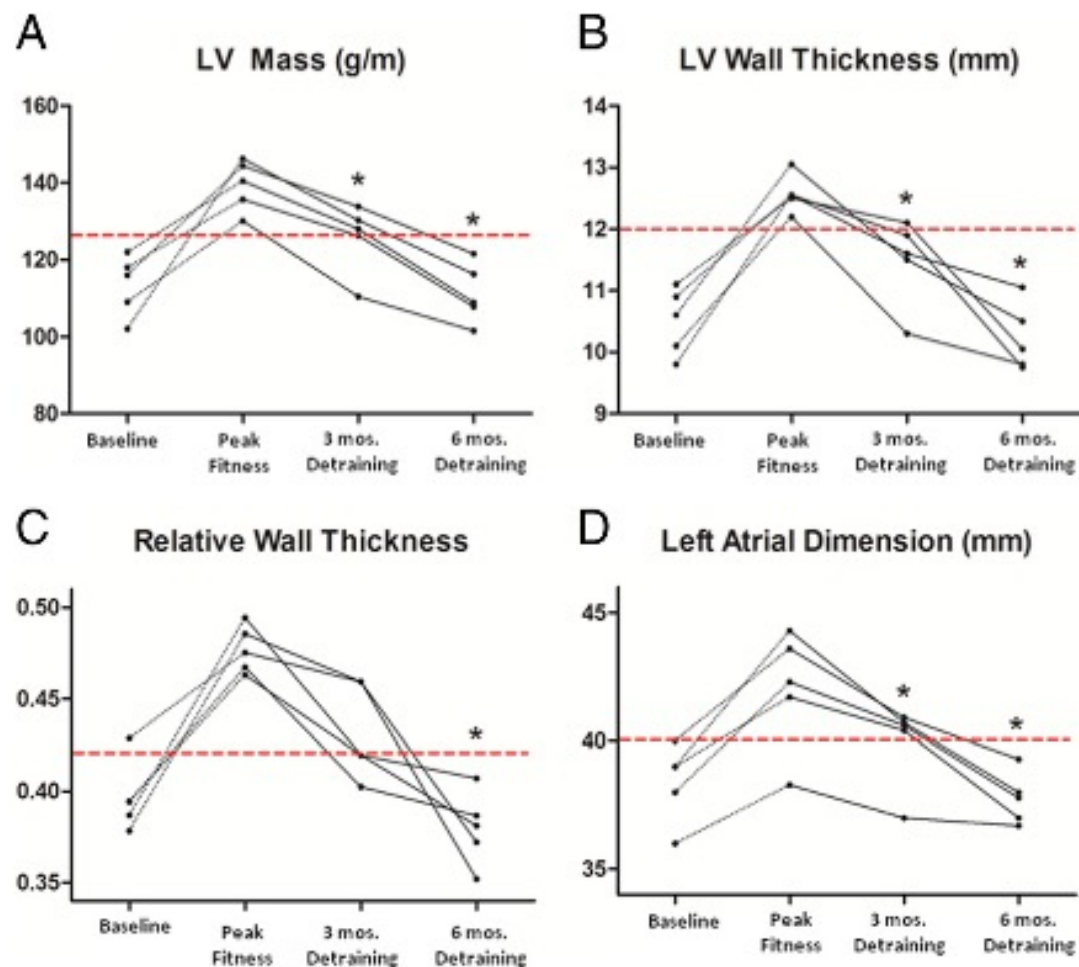
Athletes detraining

- *Ce point n'a pas fait l'objet d'études scientifiques approfondies.*
- *Etudes préliminaires évaluant la taille ou le volume de l'OG: aucun changement significatif après 4-8 semaines ou à plus long terme: 1-13 ans de désentraînement physique.*
- *Weiner et al. : cohorte de joueurs universitaires de football américain, période de désentraînement de 6 mois (limitée à < 2 heures d'exercice par semaine)*
 - *↘ des dimensions de l'OG, et de l'hypertrophie concentrique du VG*
 - *Impact + sur les ESA*

Arrhythmias in an athlete: the effect of de-training

O A Obel, C Davidson

Postgrad Med J 2005;81:62-64. doi: 10.1136/pgmj.2004.021493



At follow up after 3 months: amelioration of palpitations and light headedness. Follow up Holter monitor at that time yielded only 7 atrial ectopics/24 hours compared with 8510 ectopics/24 hours before de-training therapy, and no atrial fibrillation



Prise en charge thérapeutique et disqualification

Traitement

- ✓ Les antiarythmiques chez les sportifs avec FA sont généralement très peu désirés – tolérance !
- ✓ BB et dopage ! Interdit dans certains sports comme le tir...
- ✓ Ablation par RF reste le choix n°1 !
 - ✓ Si flutter documenté, ablation de l'isthme cavo-tricuspidé (Classe I)



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.*

From the *Arrhythmia and Electrophysiology Center, IRCCS, Policlinico San Donato, University of Milan, San Donato Milanese, Milan, Italy; †University of Milan; ‡Santa Maria di Terni Hospital; and §Division of Cardiology, Ospedale Maggiore, Crema, Italy

Catheter Ablation of Atrial Fibrillation in Athletes. *Introduction:* Atrial fibrillation (AF) may occasionally affect athletes by impairing their ability to compete, and leading to noneligibility at prequalification screening. The impact of catheter ablation (CA) in restoring full competitive activity of athletes affected by AF is not known. The aim of our study was to investigate the effectiveness of CA of idiopathic AF in athletes with palpitations impairing physical performance and compromising eligibility for competitive activities.

Methods and Results: Twenty consecutive competitive athletes (all males; 44.4 ± 13.0 years) with disabling palpitations on the basis of idiopathic drug-refractory AF underwent 46 procedures (2.3 ± 0.4 per patient) according to a prospectively designed multiprocedural CA approach that consolidates pulmonary veins (PV) isolation through subsequent steps. Preablation, effort-induced AF could be documented in 13 patients (65%) during stress ECG and significantly reduced maximal effort capacity (176 ± 21 W), as compared with patients with no AF during effort (207 ± 43 W, $P < 0.05$). At the end of CA protocol, which also included ablation of atrial flutter (AFL) in 7 patients, 18 (90.0%) patients were free of AF and two (10.0%) reported short-lasting (minutes) episodes of palpitations during 36.1 ± 12.7 months follow-up. Compared with preablation, postablation maximal exercise capacity significantly improved (from 183 ± 32 to 218 ± 20 W, $P < 0.02$). All baseline quality of life (QoL) parameters pertinent to physical activity significantly improved ($P < 0.05$) at the end of CA protocol. All athletes obtained reeligibility and could effectively reinstate sport activity.

Conclusions: AF, alone or in combination with AFL, may significantly impair maximal effort capacity thereby limiting competitive performance. Multiple PV isolation proved very effective in these patients to restore full competitive activity and allow reeligibility. (*J Cardiovasc Electrophysiol*, Vol. 19, pp. 457-462, May 2008.)

During a follow-up of 36.1 ± 12.7 months free of AADs, 18 (90.0%) patients did not present any subjective or objective (i.e., during 2,880 hours of Holter monitoring) evidence of AF recurrence

Compared to preablation, postablation maximal exercise capacity significantly improved (from 183 ± 32 to 218 ± 20 W, $P < 0.02$). All patients could reinstate the same training schedule as before the appearance of AF (≥ 20 hours per week)



En conclusion

- La FA peut être liée à des exercices d'endurance intenses.
- Elle touche principalement les hommes dans la quarantaine
- Cette vulnérabilité à la FA est probablement associée à de l'inflammation, de la fibrose, et à l'augmentation du tonus vagal.
- Le déconditionnement physique peut améliorer certains paramètres comme la taille de l'OG, les extrasystoles atriales. Toutefois son impact sur la FA reste inconnu.
- Le meilleur R/ est probablement l'approche curative par ablation: du flutter, isolation des veines pulmonaire, et recherche d'un foyer extraveineux pulmonaire

CARDIO
SCOPIE

THANK YOU

