SPORT et DAI

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CH Aix en Provence

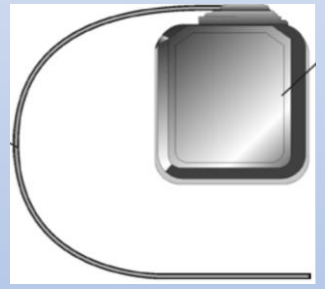
Absence de conflit d’interet

Sport can be challenging with or without ICD

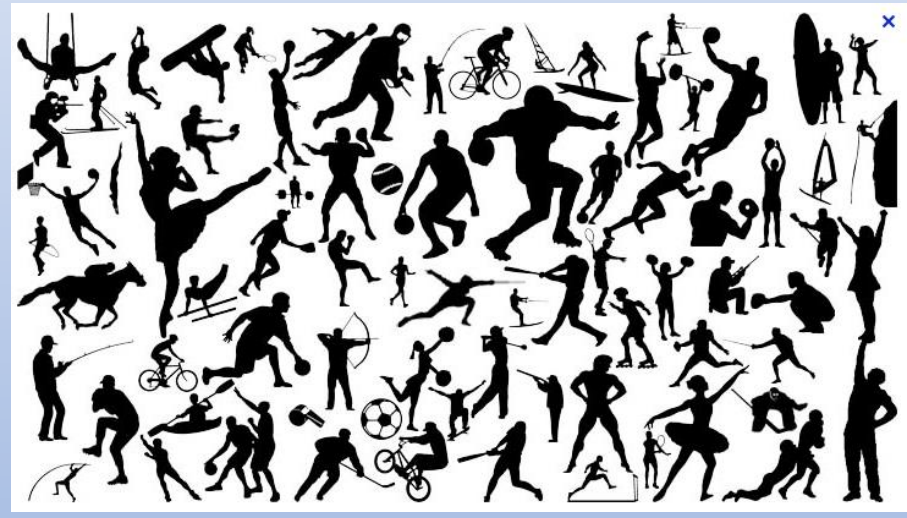
Equation

ICD

- Pacing
- chock



SPORT



CARDIOPATHY

	A DYNAMIQUE FAIBLE	B DYNAMIQUE MOYEN	C DYNAMIQUE FORT
I STATIQUE FAIBLE	BILLARD BOWLING CRICKET	BASEBALL TENNIS DE TABLE VOLLEYBALL	BADMINTON / CROSS SKI / MARCHE HOCKEY/GAZON*
	CURLING GOLF TIR ARME A FEU	ESCRIME TENNIS DOUBLE	COURSE ORIENT. COURSE LONGUE D. SQUASH TENNIS / FOOT
II STATIQUE MOYEN	TIR A L'ARC COURSE AUTO*$ PLONGEE S MARINE*$	SPRINT / SURF*$ PATINAGE*	BASKET* / SKI FOND HOCHEY/GLACE* NATATION / HAND
	EQUITATION*$ MOTOCYCLISME*$ PLONGEON	FOOT A / NAT.SYNCH.$ RODEO / RUGBY* SAUT ATHLET.	CROSSE CANADIENNE COURSE MOYENNE D. BIATHLON
III STATIQUE FORT	BOBSLEIGH*$ SKI NAUTIQUE GYMNASTIQUE*$	BODY BULDING*$ SKI DESCENTE*$ LUTTE*	BOXE* CANOE/KAYAK CYCLISME*
	ARTS MARTIAUX*$ LUGE*$ / VOILE ESCALADE*$ HALTEROPHILIE*$ PLANCHE A VOILE*$	SKATEBOARD SNOWBOARD	DECATHLON AVIRON PATIN DE VITESSE TRIATHLON
* risque de traumatisme	$ risque lié à l'environnement en cas de syncope		

CONFERENCE DE BETHESDA 2005

2005

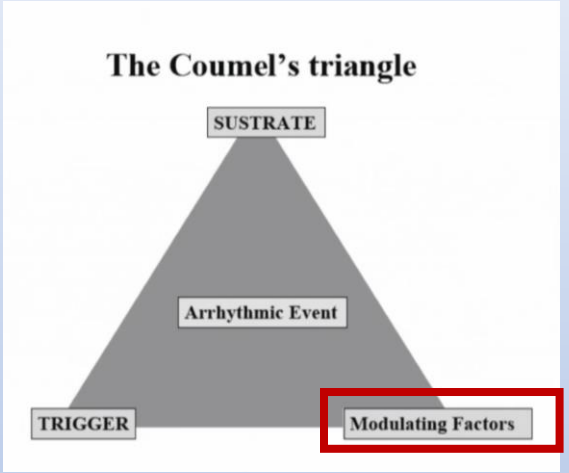
"Athletes with conditions that result in cardiac arrest… generally are treated with an ICD and cannot participate in any moderate- or high-intensity competitive sports.

However, athletes with ICDs and who have had no [arrhythmias] for six months may engage in class IA competitive sports."

36th Bethesda Conference: Eligibility recommendations for competitive athletes with cardiovascular abnormalities
Maron, Zipes, et al, JACC 2005

Basis for these recommendations (consensus)

- Increase risk of arythmia / failure to defibrillate
- Substrate progression
- Trauma
  - Patient: injury caused by loss of control due to arrhythmia-related syncope and/or shock
  - Damage to the ICD system.



Restriction of sport downsides

Decrease both physical and emotional quality of life of many adolescents with ICDs

McAllister Quality of life assessment in elite collegiate athletes. Am J Sports Med. 2001
Rahman Adolescents with implantable cardioverter defibrillators: a patient and parent perspective. Pacing Clin Electrophysiol. 2012

2006 **retrospective survey** of HRS physician-members

- Many ICD patients were participating in sports, despite the consensus recommendations
- No serious adverse events described

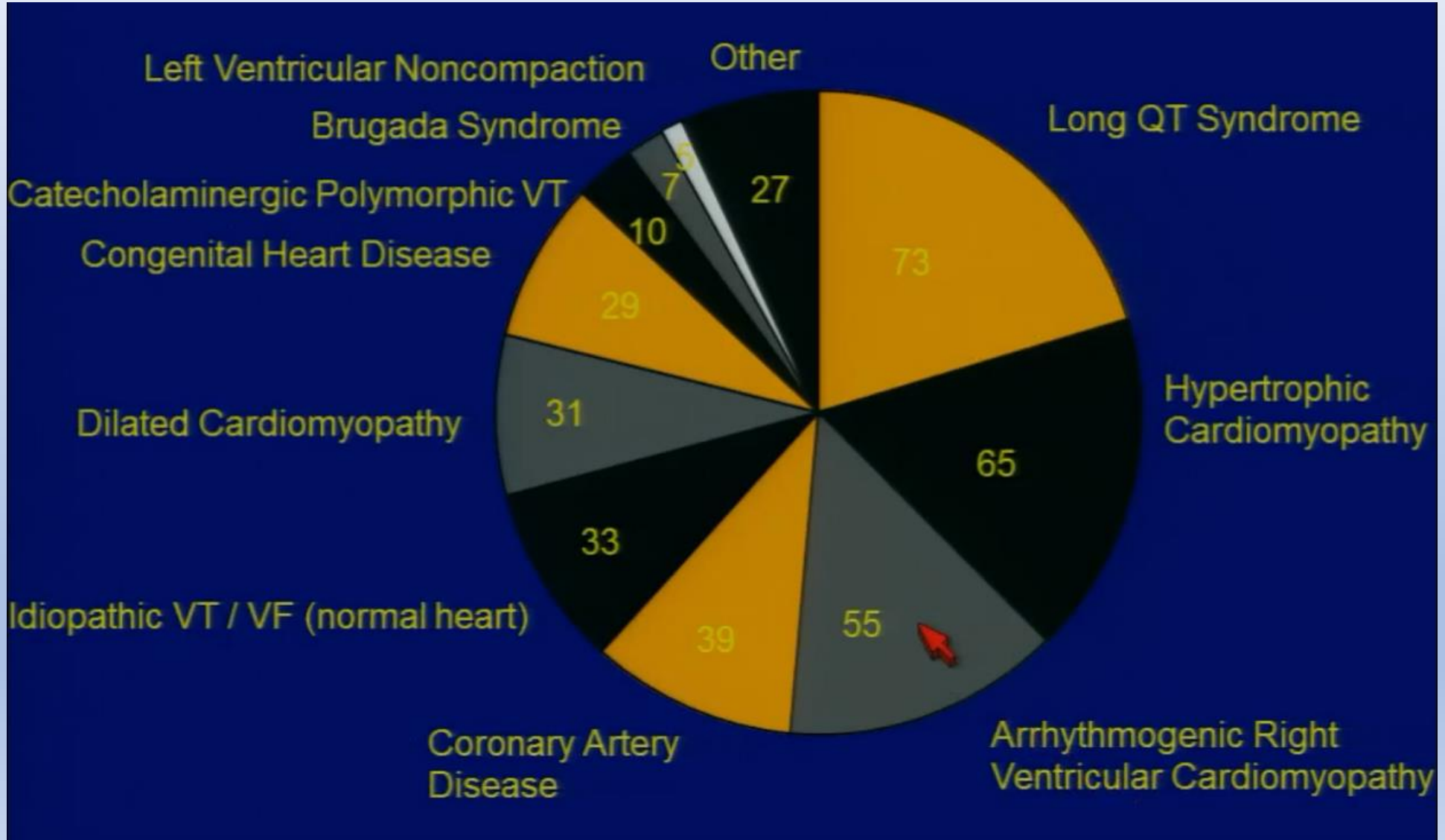
Lampert R, Cannom D, Olshansky B. Safety of sports participation in patients with implantable cardioverter-defibrillators: A survey of Heart Rhythm Society Members. J Cardiovasc Electrophysiol. 2006

The ICD sports registry

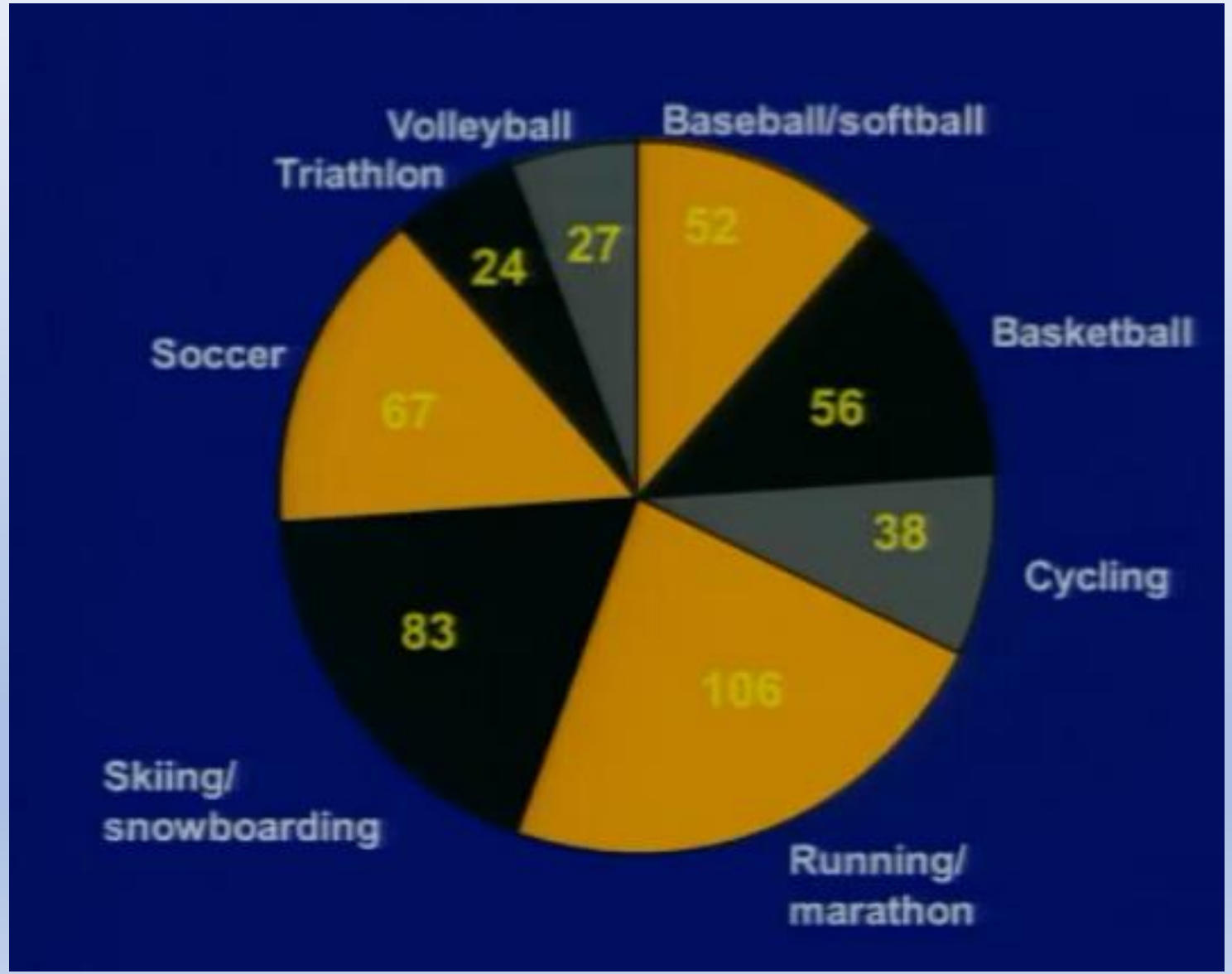
- 440 athletes with ICDs, 10-60 years, 2/3 males
- Secondary prevention: 46%
- Prospective
  - Participants contacted regularly during the follow-up
  - ICD records obtained
  - Rhythms adjudicated for shocks received at any time
  - Median follow-up : 44 months

Lampert et al. Safety of sports for athletes with implantable cardioverterdefibrillators: results of a prospective, multinational registry. Circulation. 2013;
Lampert R et al. Safety of sports for athletes with implantable cardioverterdefibrillators:long-term results of a prospective multinational registry. Circulation. 2017

Cardiopathie



Sport


Volleyball
Baseball/softball
Triathlon
27
52
24
Basketball
Soccer
56
67
38
Cycling
83
106
Skiing/
snowboarding
Running/
marathon

Primary endpoints

The ICD sports registry

- Failures of the ICD to defibrillate or externally resuscitated arrests

None

- Injuries due to syncopal arrhythmia or loss of control following shock

None

Lampert R et al. Safety of sports for athletes with implantable cardioverterdefibrillators:long-term results of a prospective multinational registry. Circulation. 2017

The ICD sports registry

- **10% received appropriate shocks** (for VT/VF) during competition or practice
- Shocks occured more **during physical activity** than during rest (20% vs 10%)
- No difference between sport competition/practice and other physical activities (12% vs 10%)

The ICD sports registry

Chocks during sport

- ICD shocks decrease quality of life*
- **1/3 who received shocks during sports stopped** playing sports for a period of time but **most returned to sports** later on. 4 pts stopped definitively.

*Schron EB et al. Quality of life in the antiarrhythmics versus implantable defibrillators. Circulation. 2002;105(5

The ICD sports registry: conclusions

Safety of sport in a population of athletes with ICD on primary end point but

- Registry (no control arm)
- No extreme sport
- Power limitation
  - 376 patients followed 2 years
  - 167 patients followed 4 years

2015 USA

- Participation in sports classified as IA for athletes with an ICD **is reasonable** if they are free of episodes of ventricular flutter or ventricular fibrillation requiring device therapy for **3 months** *(Class IIa; Level of Evidence C)*

- Participation in sports with higher peak static and dynamic components than class IA **may be considered** if the athlete is free of episodes of ventricular flutter or ventricular fibrillation requiring device therapy for **3 months**.

Eligibility and Disqualification **Recommendations** for Competitive Athletes With Cardiovascular Abnormalities: Task Force 9: Arrhythmias and Conduction Defect Circulation 2015s

2020 Europe

Shared decision making should be considered during decisions relating to continuation of intensive or competitive sports participation in individuals with an ICD, taking into account the effect of sports on the underlying substrate, the fact that intensive sports will trigger more appropriate and inappropriate shocks, the psychological impact of shocks on the athlete/patient, and the potential risk for third parties.	IIa	C

Sports cardiology and exercise ESC Guidelines 2020

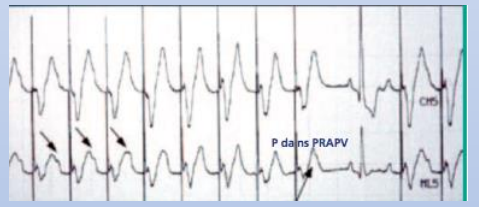
Questions before authorization

- Type of sport (intensité, risque traumatique)
- Competition / leasure
- Cardiopathy and rythm stability
- Catecholamine impact (ARVD, ischemia, CPVT…)
- Optimal treatment (Betablocker)

Precaution before authorization

- VT Programming
  - TSV Discrimination + first therapy zone >200bpm (sinusal tachycardia)
  - Increasing detection duration +/- lowering sensibility
  - Inform patient (heart rate monitor)

- Pacing programming
  - Pacing dependant: inform patient (avoid climbing, car race…)
  - High Maximum rate (AV + PVARP) and rate response



- Home monitoring to detect lead deterioration, rythm instability

- Subclavicular compression
  - Patient should be aware of shoulder mobility and lead stress
  - SICD should be prefered if possible

* Schuger CD, Mittleman R, Habbal B et al. Ventricular lead transection and atrial lead damage in a young softball player shortly after the insertion of a permanent pacema- ker. Pacing Clin Electrophysiol 1992 ; 15 (9) : 1236-9.

Après avoir été victime d'un arrêt cardiaque en plein match de l'Euro, le 12 juin 2021, le milieu danois Christian Eriksen retrouve les terrains. Le joueur, qui s'est fait implanter un défibrillateur, s'est entraîné lundi pour la première fois avec son nouveau club, le Brentford FC (Royaume-Uni).

Conclusion

- Autorisation of sport practice with ICD should take into account
  - Type of sport and intensity
  - Type of cardiopathy
- Patient should be informed that
  - Chocks may occur during sport
  - ICD system may be lured or deteriorated
  - Lead is the weak point and how to be careful with subclavicular compression
- ICD should be specificly programmed to avoid inappropriate chocks and to follow sport activity
- Chocks may decrease quality of life but sport cessation too

Safety of Sports for Athletes With Implantable Cardioverter-Defibrillators

Results of a Prospective, Multinational Registry

372 athlètes avec DAI, sport intensif, suivi 31 mois
Pas de décès ni de blessure due à un choc au cours du suivi
- 10% choc durant compétition ou entrainement
- 8% choc durant autre activité physique
- 6% choc au repos
- pour 8 patients multiples chocs nécessaires :

Table 5. Events/Individuals Requiring >1 Shock for Termination to Sinus Rhythm

Sex	Age, y	Cardiac Diagnosis	Primary Sport	Activity	Activity Type	Shocks, n
M	28	Idiopathic VF	Ultimate Frisbee	Ultimate Frisbee	Competition	5
F	47	Idiopathic VF	Cycling	Cycling	Practice	4
M	44	CAD	Running	Running	Practice	2
M	50	CAD	Cycling	Cycling	Practice	6
M	57	CAD	Tennis, basketball	Walking	Physical Activity	6
F	16	CPVT	Lacrosse field hockey	Running	Post–physical activity	3
				Running	Post–physical activity	4
M	15	HCM	Baseball	Socializing	Other	2

CAD indicates coronary artery disease; CPVT, catecholaminergic polymorphic ventricular tachycardia; HCM, hypertrophic cardiomyopathy; and VF, ventricular fibrillation.

Lampert et al. Circulation 2013