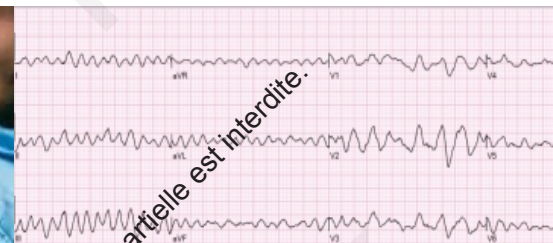
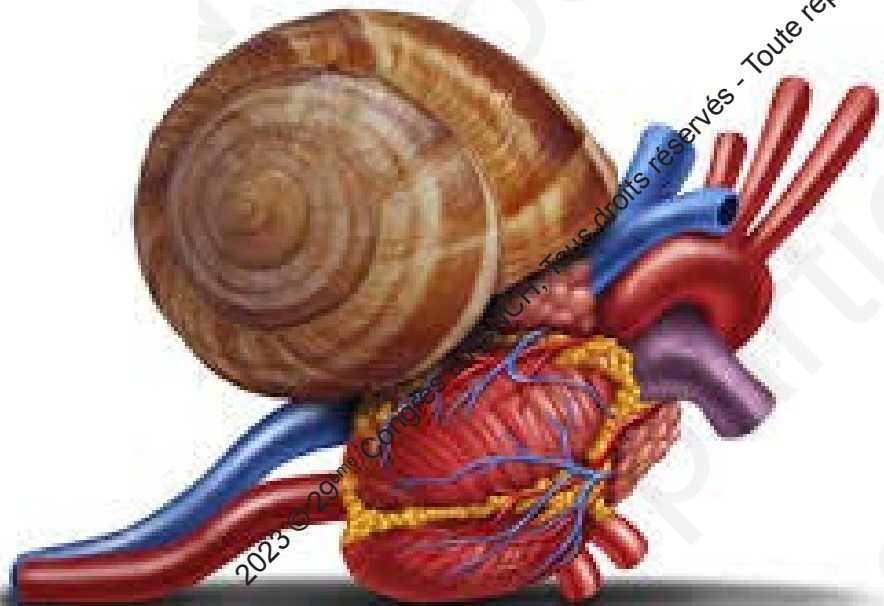


Prevention de la mort subite en 2023

Reste-t-il une place pour le DAI ?



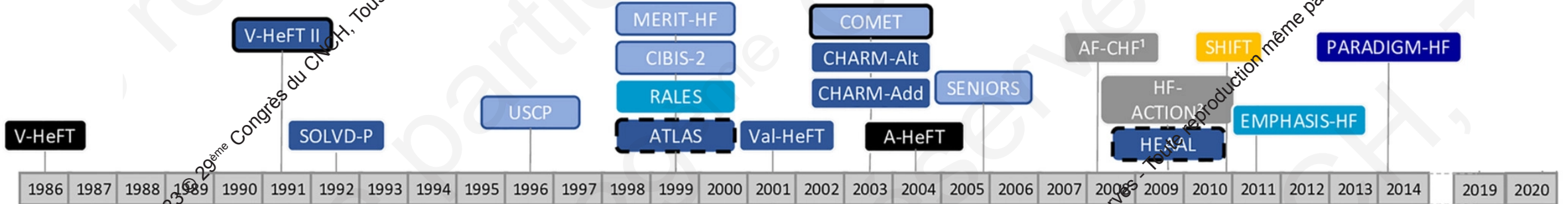
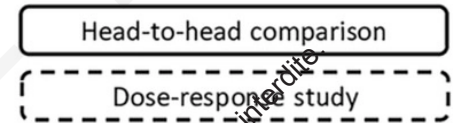
Vendredi 24 Novembre
Congres CNCH Paris
Arnaud OLIVIER



Evolution des traitement de l'HF

- Hydralazine and isosorbide dinitrate (H-ISDN)
- Angiotensin-converting-enzyme inhibitor (ACEI)
- Angiotensin receptor blocker (ARB)
- Mineralocorticoid receptor antagonist (MRA)
- Beta-blocker
- Digoxin
- Surgery
- Implantable cardioverter defibrillator/ cardiac resynchronization therapy (ICD/CRT)
- Ivabradine
- Angiotensin receptor neprilysin inhibitor (ARNI)
- Sodium-glucose co-transporter-2 inhibitors (SGLT-2)
- Soluble Guanylate Cyclase stimulator
- Myosin activator
- Ferric carboxymaltose

Tomasoni D et al. ESC Heart Failure, 2020



2022
Emperor-Reduced
Deliver

Hydralazine,
Isosorbide dinitrate
ACEi-ARB

Beta-blockers

ICD/CRT, digoxin
MRA

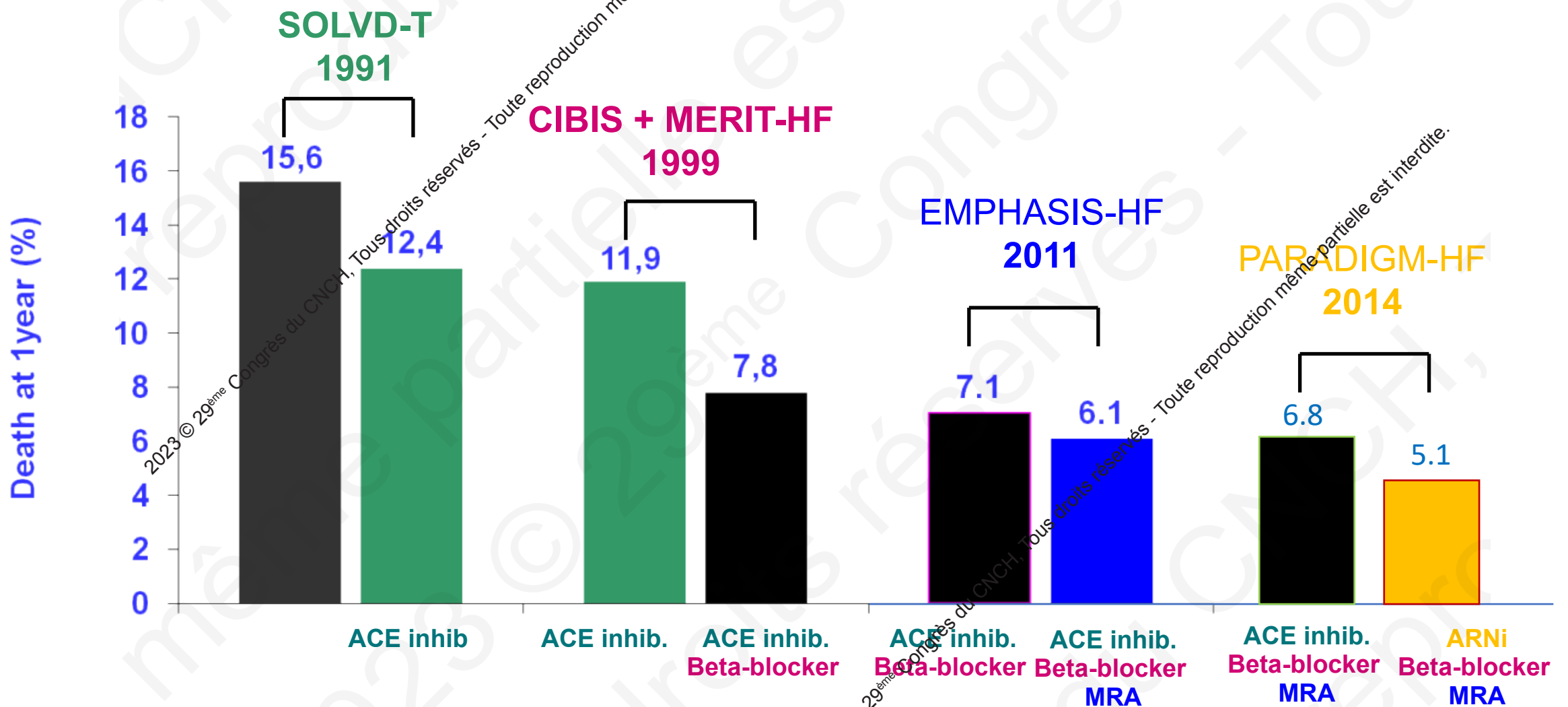
ARNi

SGLT2i

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Baisse mortalité cardiaque suite à 20 ans de succès

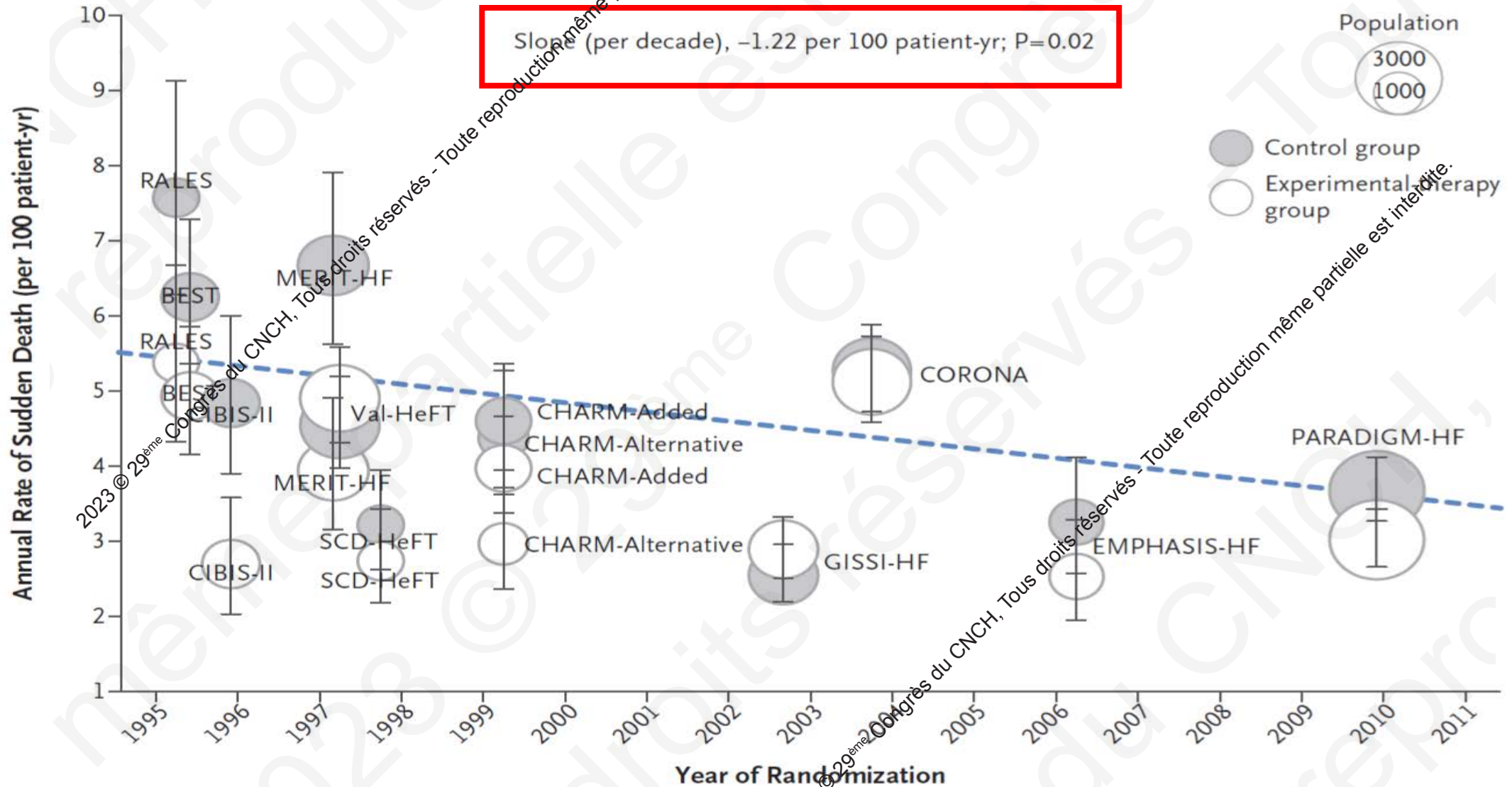


The SOLVD Investigators. *N Engl J Med.* 1991;325:293-302. CIBIS II. *Lancet* 1999;353:9-13.

MERIT-HF. *Lancet.* 1999;353:2001-2007.

EMPHASIS Study, Zannad F, et al. *NEJM* 2011

Baisse de la mort subite subite



Il y a effectivement
une baisse de la mort subite
grâce au traitement médical



Pour autant faut-il ne plus implanter de DAI ?

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1

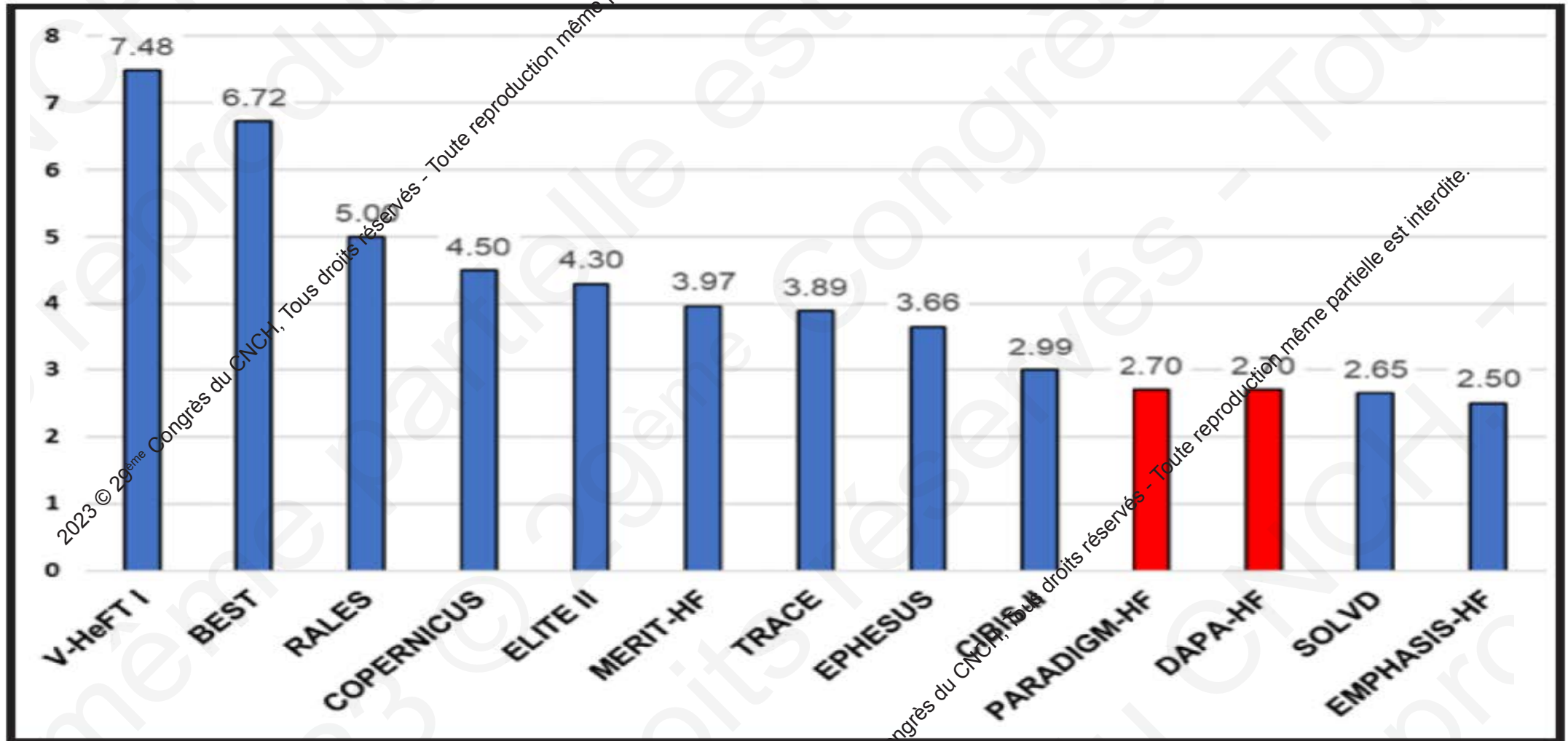
Diminution ne veut pas dire disparition

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Risque résiduel de mort subite

Effet bénéfique sur la réduction de mort subite, mais risque résiduel encore élevé



DAI recommandé dans CMH si risque à 5 ans > à 6% (1,2% risque annualisé)

Risque résiduel de mort subite subite

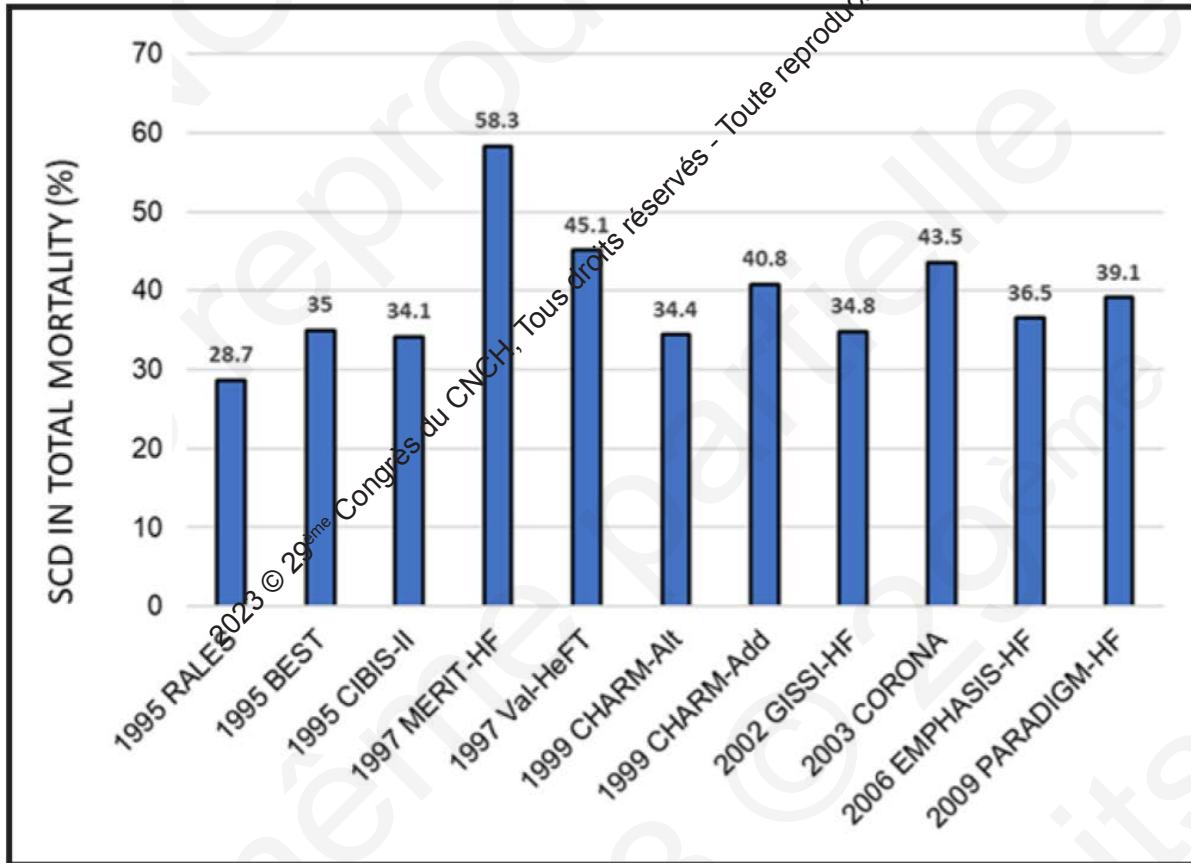
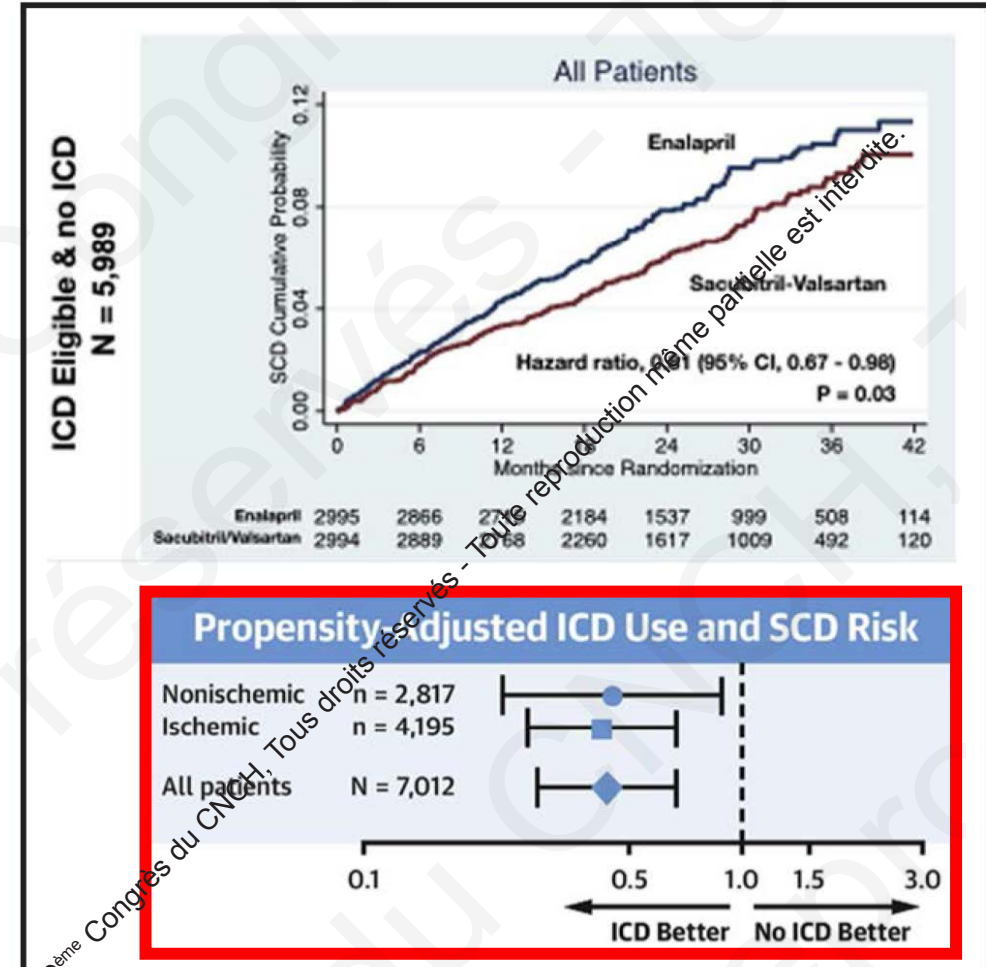


Figure 5. SCD rate as a percentage of total mortality in HF trials.



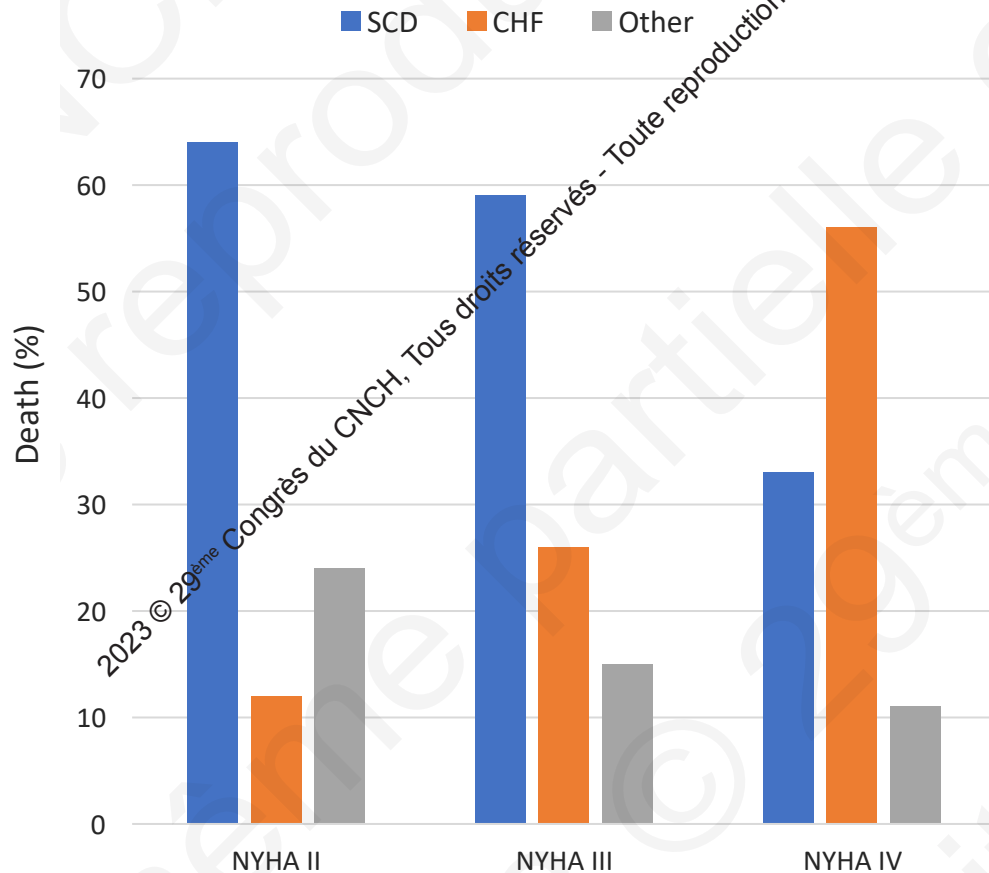
2

Toutes les cardiopathies
et tous les patients
ne sont pas égaux

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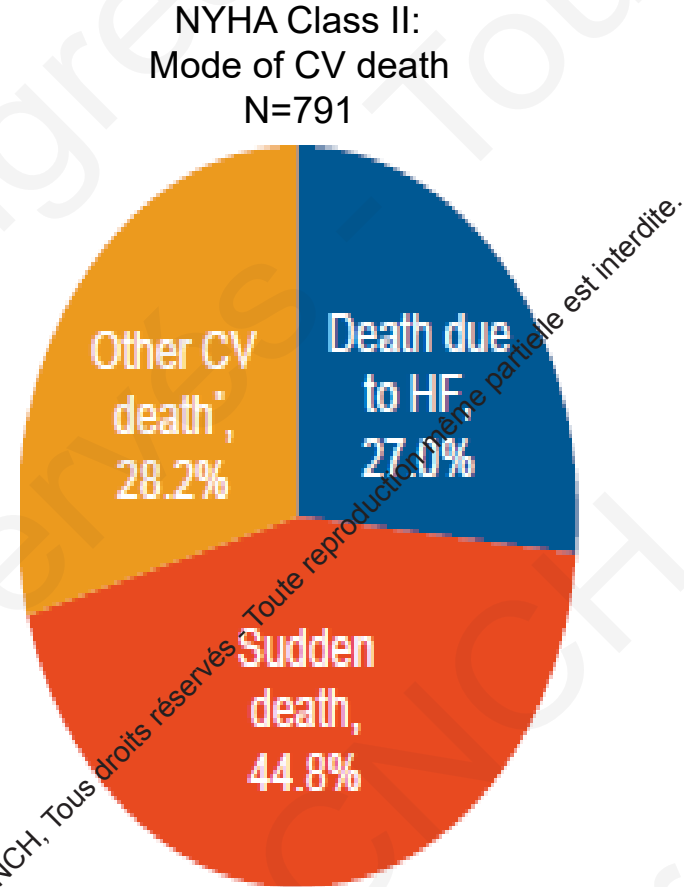
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Influence de la sévérité du patient



A post-hoc analysis from MERIT-HF
(n=3991)¹
Mean follow up, 1 year

MERIT-HF Study Group. Lancet. 1999;353(9169):2001-7;



NYHA Class II:
Mode of CV death
N=791

An analysis from PARADIGM-HF
(n=8399)²
Median follow up, 2.3 years

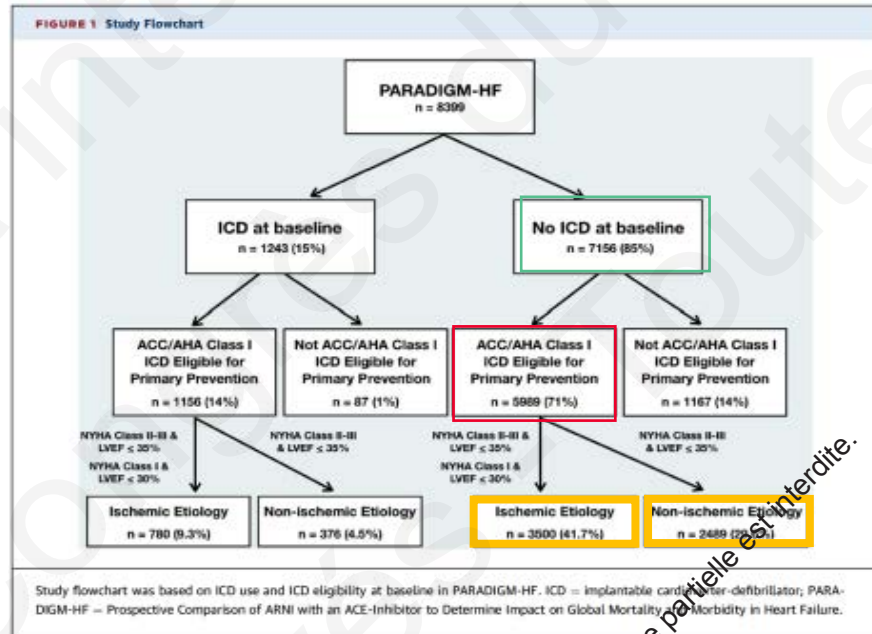
Desai AS et al. Eur Heart J. 2015;36:1990-7

Influence de la cardiopathie

Sacubitril/Valsartan and Sudden Cardiac Death According to Implantable Cardioverter-Defibrillator Use and Heart Failure Cause

A PARADIGM-HF Analysis

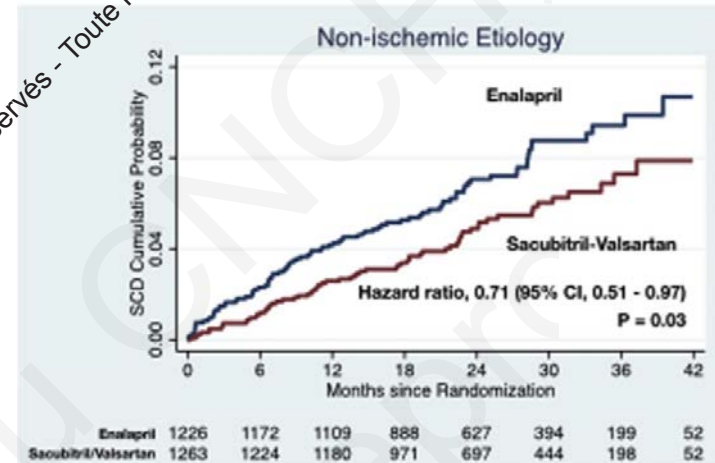
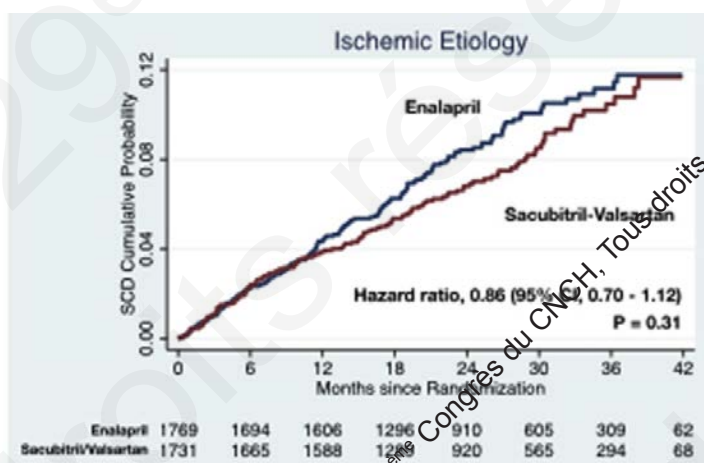
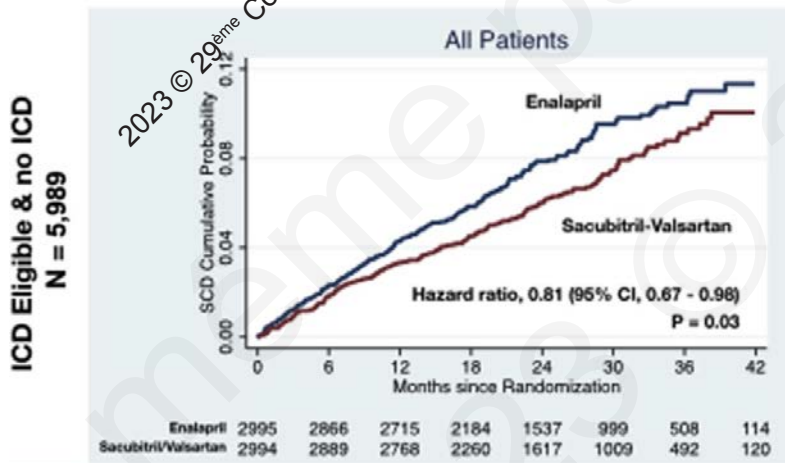
Luis E. Rohde, MD, ScD,^{a,b} Neal A. Chatterjee, MD, MSc,^c Muthiah Vaduganathan, MD, MPH,^a Brian Claggett, PhD,^a



Tous les patients
P<0,05

Patients ischémiques
Pas de différence significative

Patients non-ischémiques
P<0,05



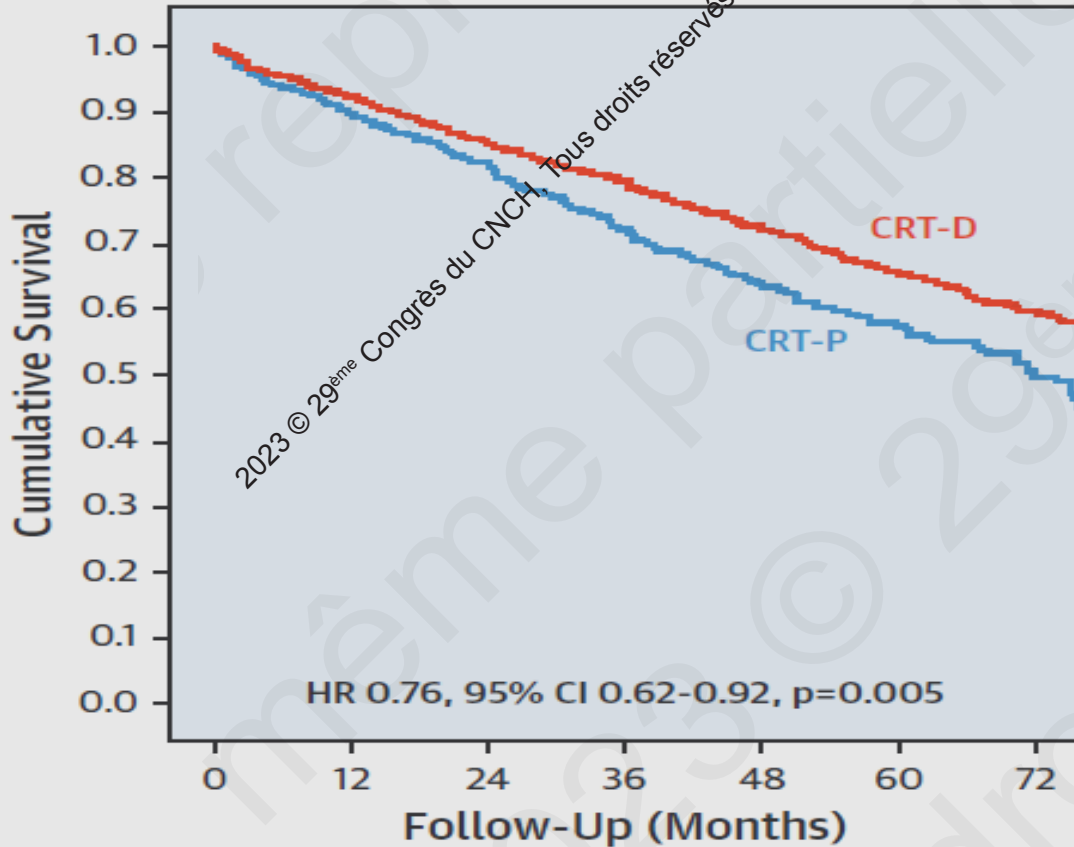
Baisse beaucoup plus faible pour CMI

Influence de la cardiopathie

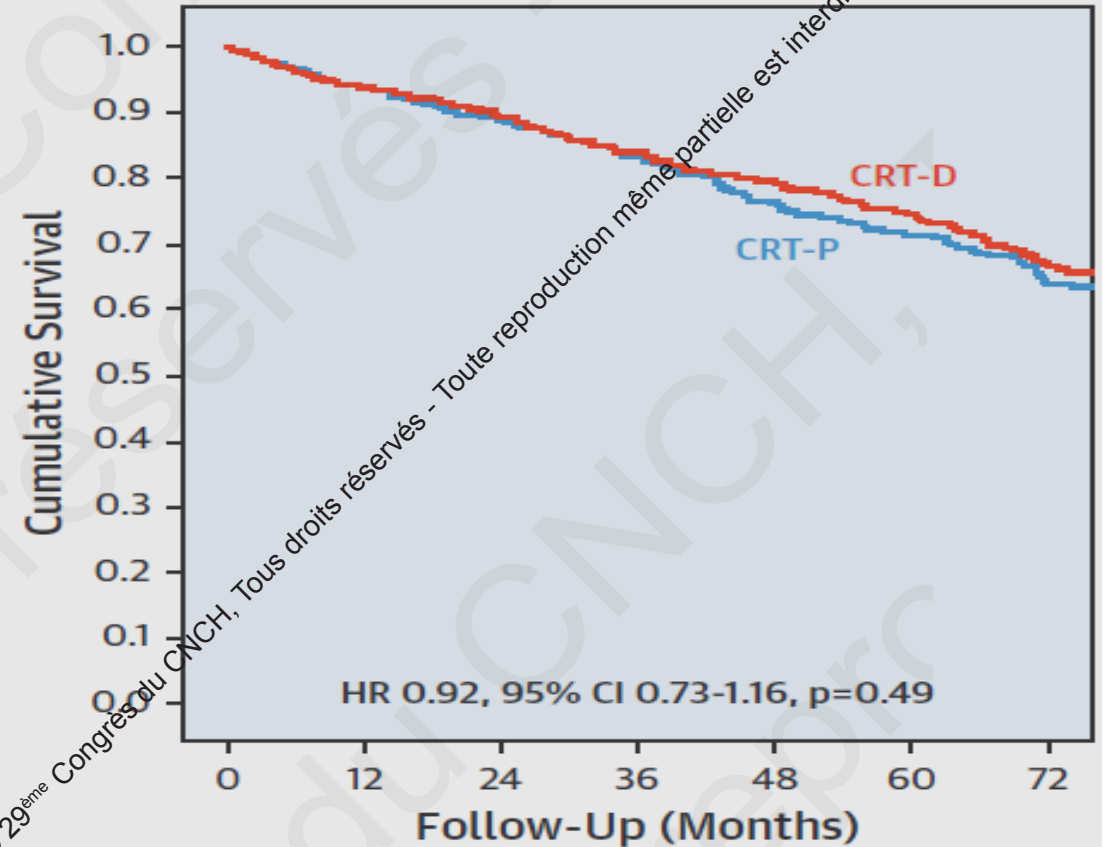
the French-UK-Sweden CRT Network

Adding Defibrillation Therapy to Cardiac Resynchronization on the Basis of the Myocardial Substrate

ISCHEMIC CARDIOMYOPATHY

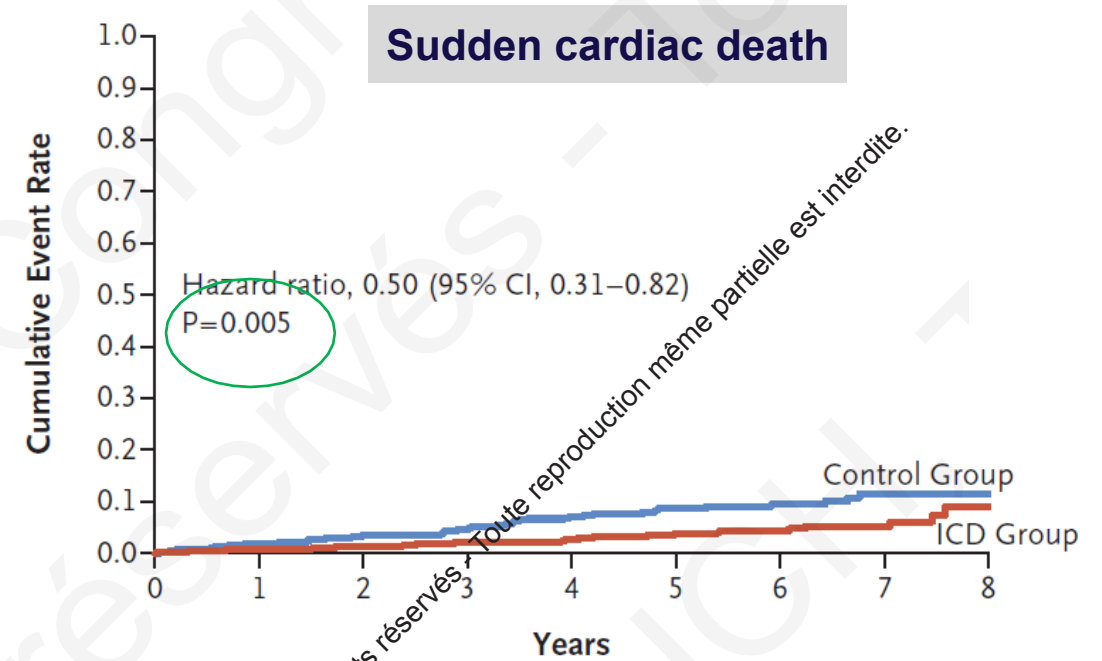
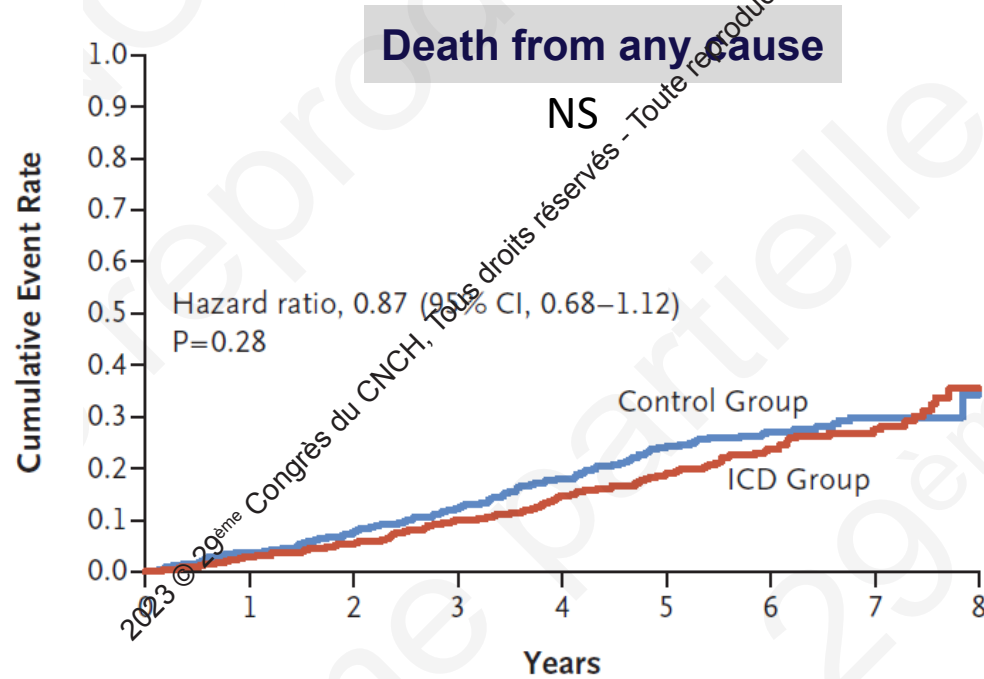


NON-ISCHEMIC DILATED CARDIOMYOPATHY



Influence de l'âge du patient

Etude DANISH: Defibrillateur chez le non-ischémique?



Subgroup	ICD Group no. of events/total no.	Control Group no. of events/total no.	Hazard Ratio (95% CI)	P Value	P Value for Interaction
Age					0.009
<59 yr	17/167	34/181	0.51 (0.29–0.92)	0.02	
≥59 to <68 yr	36/173	50/202	0.75 (0.48–1.16)	0.19	
≥68 yr	67/216	47/177	1.19 (0.81–1.73)	0.38	

Interaction avec Âge sur la mortalité toute cause

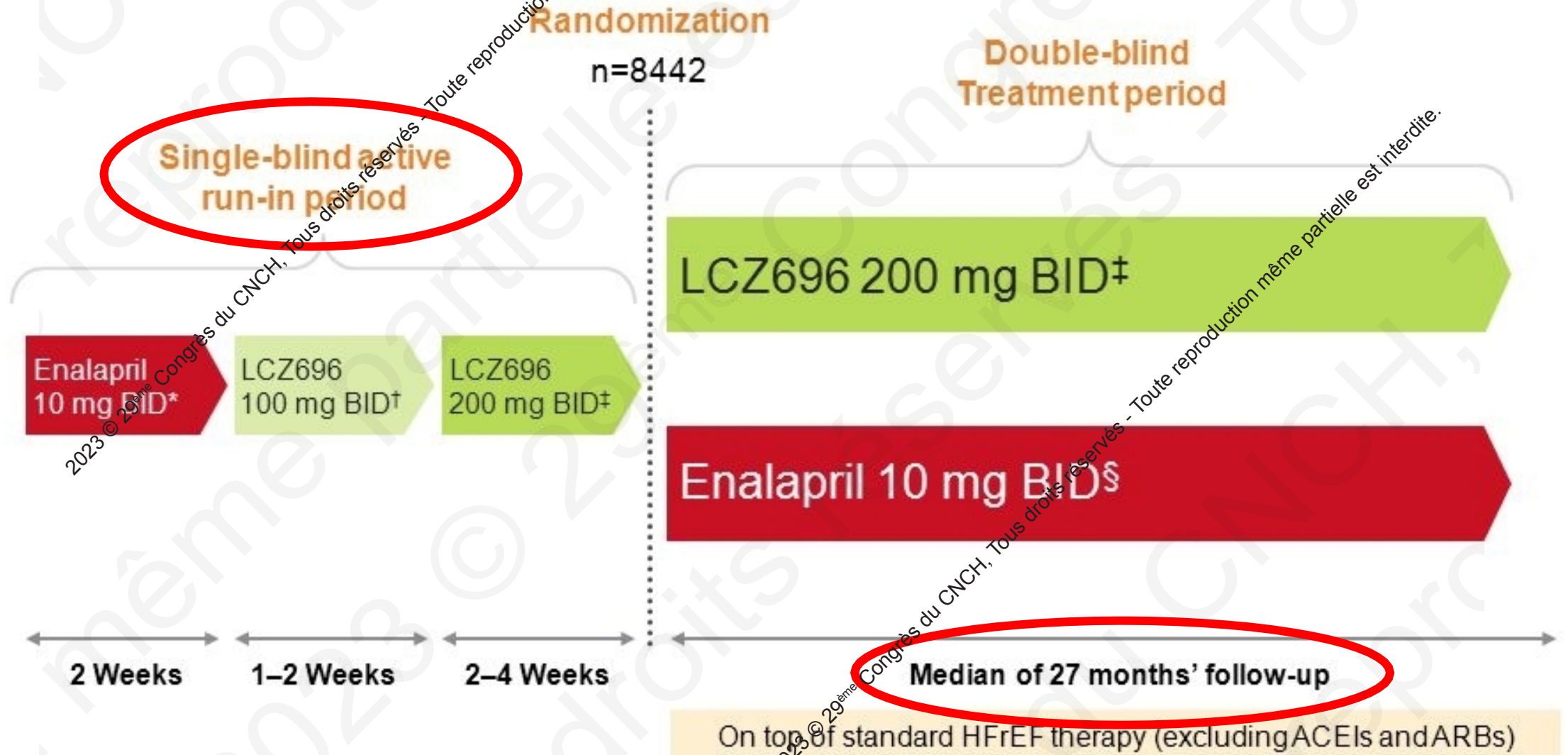
3

Les patients des études ne sont pas
Ceux de la vraie vie

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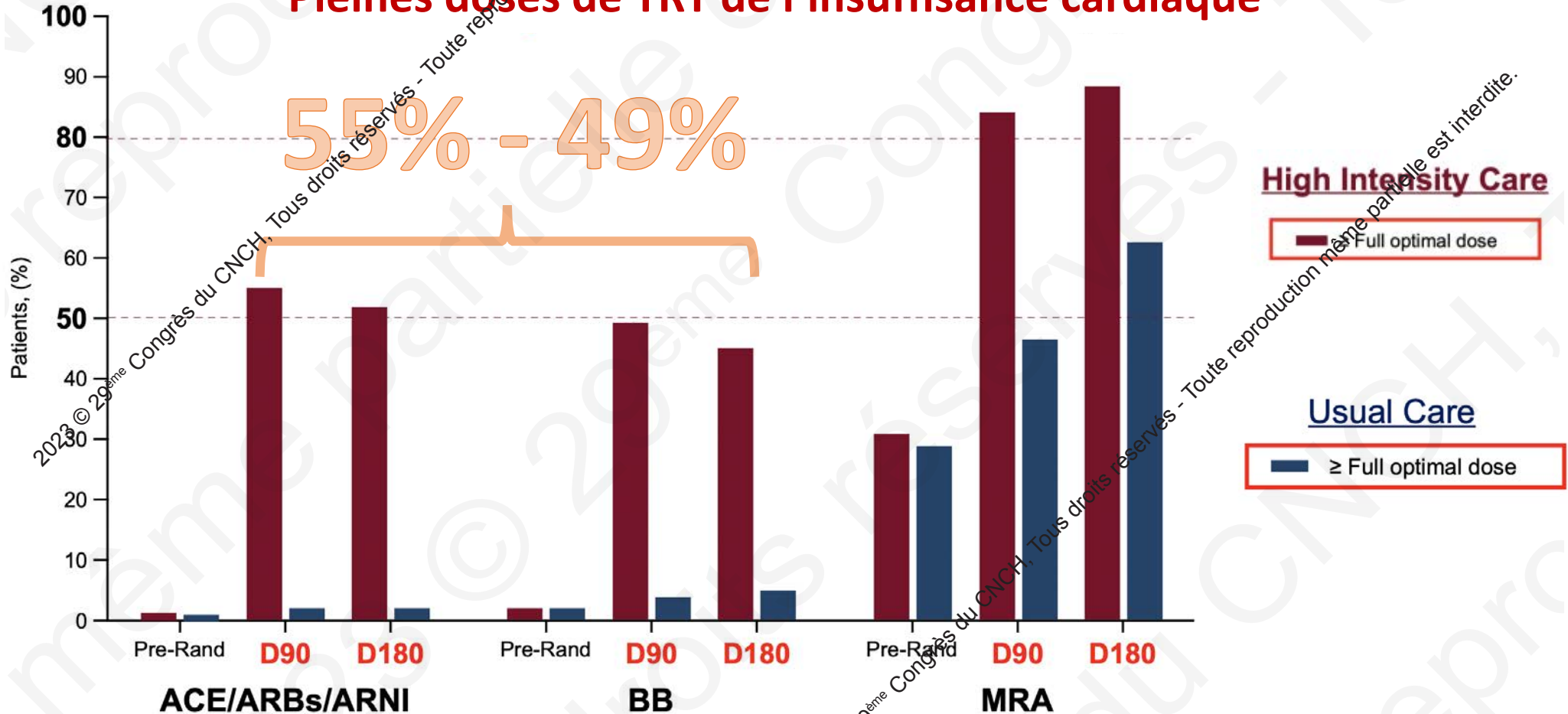
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PARADIGM-HF Study design



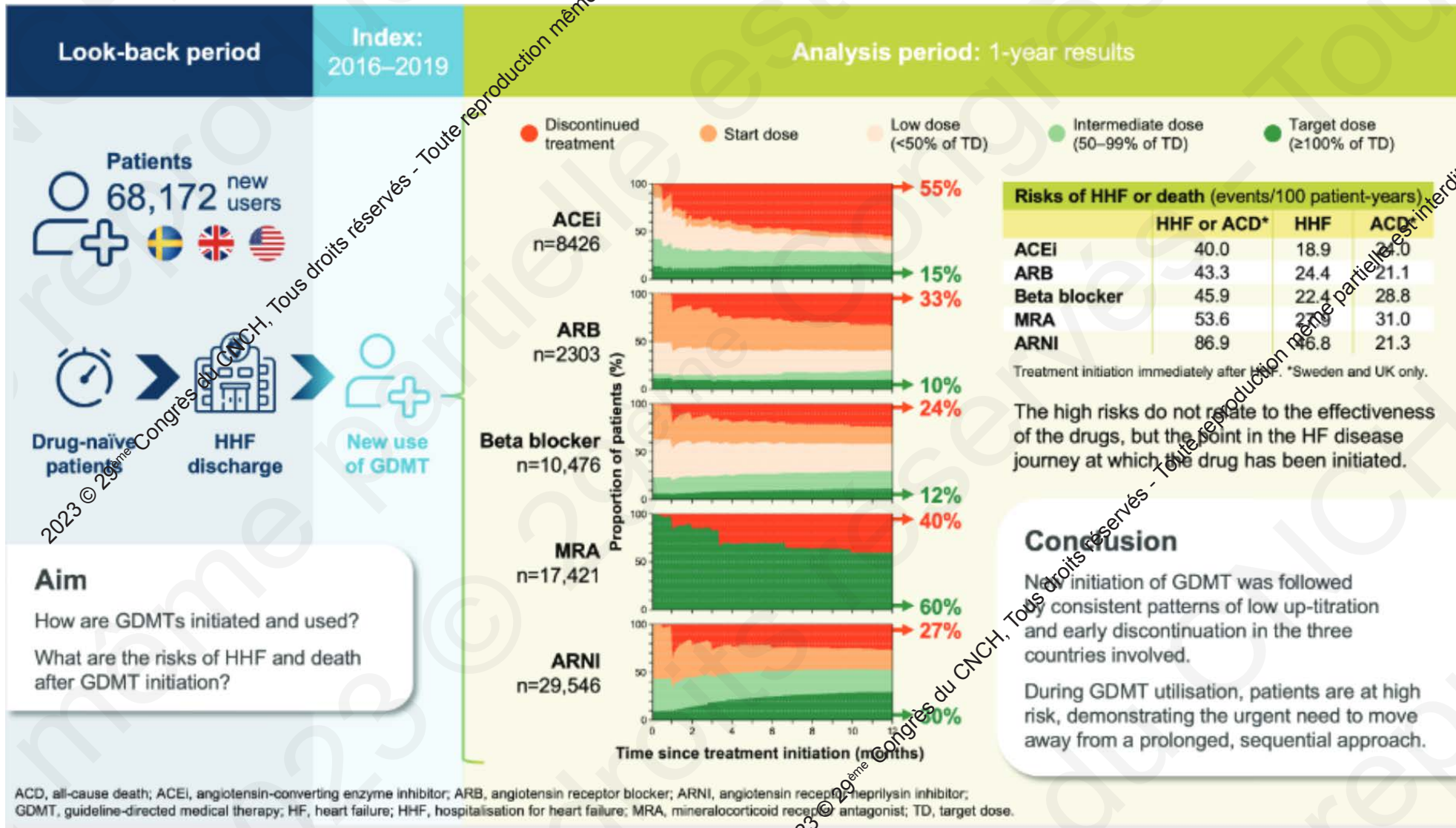
STRONG-HF Study

Pleines doses de TRT de l'insuffisance cardiaque



Safety, tolerability and efficacy of up-titration of guideline-directed medical therapies for acute heart failure (STRONG-HF):

Probleme de l'inertie therapeutique



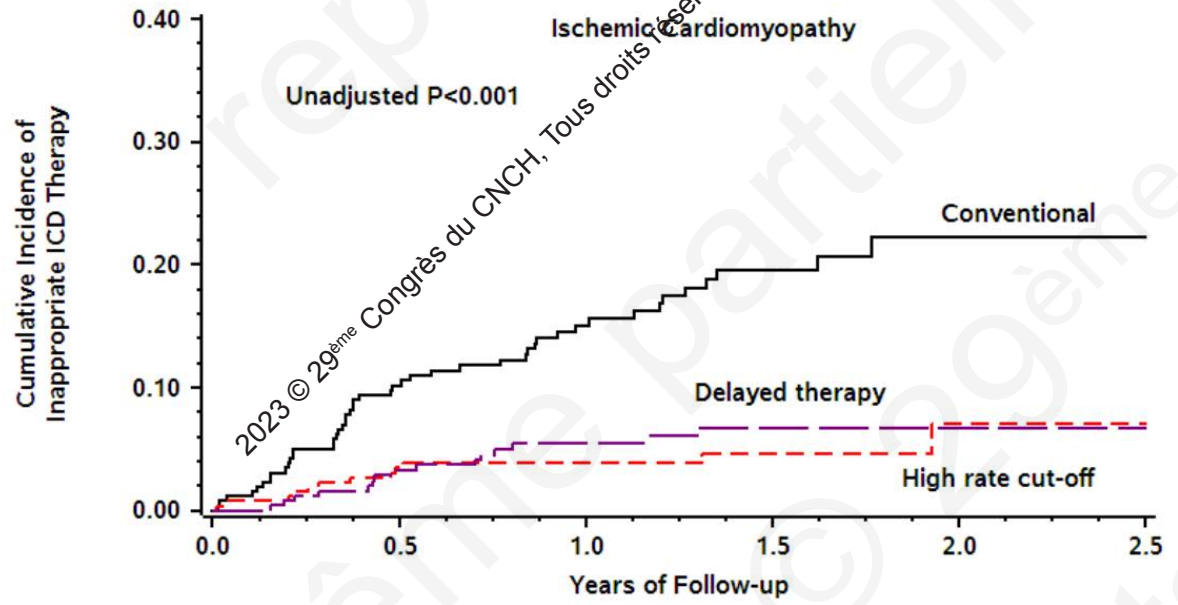
4

Le DAI d'hier n'est pas
(tout a fait)

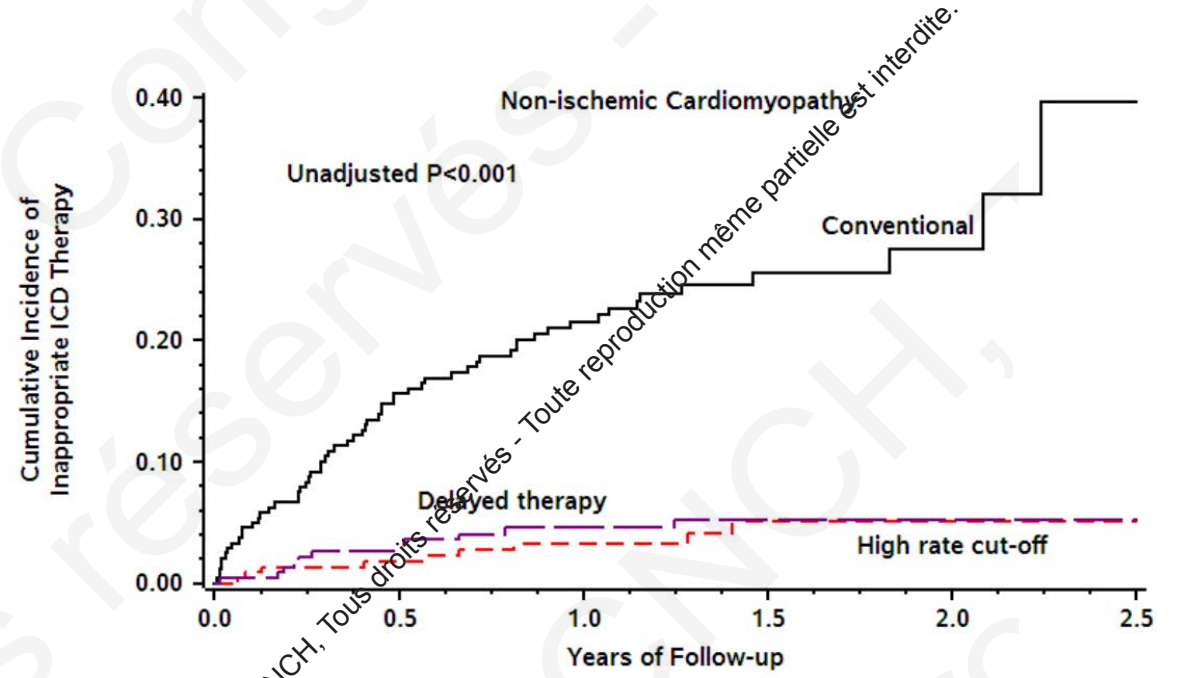
Le DAI d'aujourd'hui

Programmation du DAI encocavitaire

The Effect of ICD Programming on Inappropriate and Appropriate ICD Therapies in Ischemic and Non-ischemic Cardiomyopathy: The MADITRIT Trial





Patients at Risk						
Conventional	271	224 (0.10)	167 (0.15)	105 (0.20)	48 (0.22)	48 (0.22)
High rate cut-off	268	244 (0.03)	243 (0.04)	135 (0.05)	38 (0.07)	38 (0.07)
Delayed therapy	252	232 (0.03)	206 (0.05)	132 (0.07)	132 (0.07)	132 (0.07)



Patients at Risk						
Conventional	283	197 (0.16)	159 (0.22)	74 (0.26)	38 (0.28)	8 (0.40)
High rate cut-off	231	211 (0.02)	186 (0.03)	98 (0.05)	98 (0.05)	98 (0.05)
Delayed therapy	233	213 (0.03)	189 (0.05)	134 (0.05)	134 (0.05)	134 (0.05)

Le DAI sous cutané

Primary Results From the Understanding Outcomes With the S-ICD in Primary Prevention Patients With Low Ejection Fraction (UNTOUCHED) Trial  

1111 patient suivis 18 Mois

88% NYHA \geq II

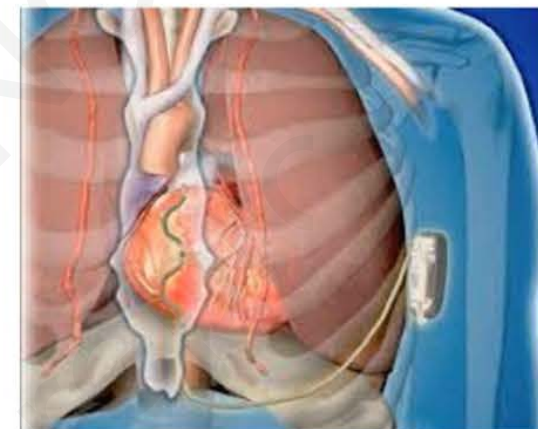
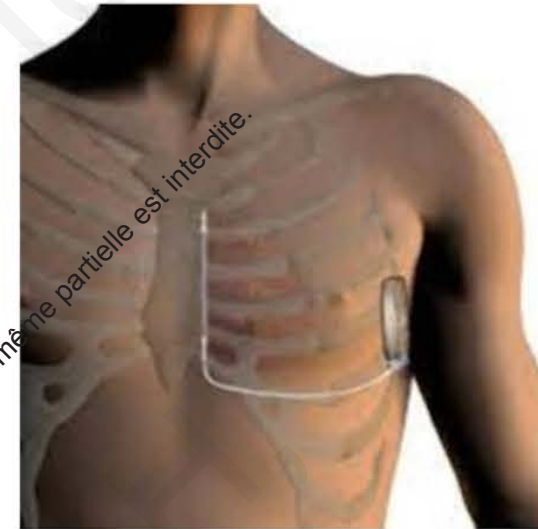
53% CMI

FEVG26%

Taux de chocs inappropriés à 18 mois: 4,1% (2,2% sur GEN3)

Taux de chocs appropriés à 18 mois: 5,3%

Gold MR, et al UNTOUCHED Investigators*. Circulation. 2021



**Bon...OK...On continue les DAI
Mais en attendant Madit 3
peut ont améliorer la stratification ?**



Utilisation de score pour stratifier le risque

The MADIT-ICD benefit score



ESC European Society of Cardiology
 CLINICAL RESEARCH Arrhythmias
Predicted benefit of an implantable cardioverter-defibrillator: the MADIT-ICD benefit score
 Arwa Younis¹, Jeffrey J. Goldberger¹, Valentina Kutyla¹, Wojciech Zareba¹, Bronislava Polonsky¹, Helmut Klein¹, Mehmet K. Aktas¹, David Huang¹, James Daubert¹, Mark Estes¹, David Cannom², Scott McNitt¹, Kenneth Stein¹, and Ilan Goldenberg^{1*}

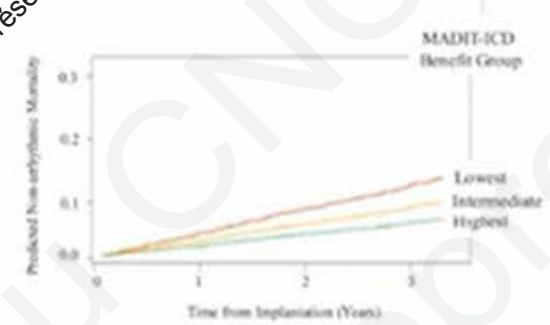
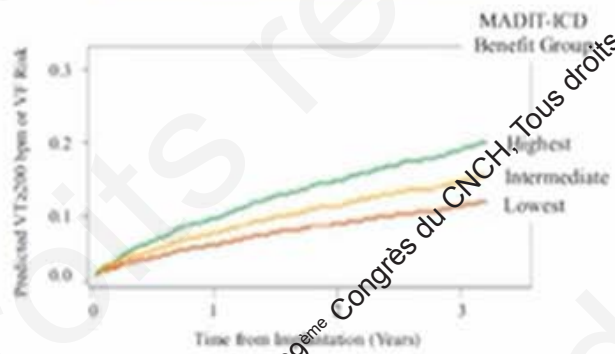
VT/VF Score	
Variable	Points
LVEF <=25%	+1
Atrial arrhythmia	
Heart Rate > 75 bpm	
SBP <140 mmHg	+2
Myocardial Infarction	
Age < 75 yrs	
Male	
Prior NSVT	

Non-arrhythmic Mortality Score	
Variable	Points
CRT-D	-1
NYHA ≥II	+2
Diabetes	
BMI <23 kg/m ²	
Atrial arrhythmia	
LVEF <=25%	
Age ≥ 75 years	

MADIT-ICD Benefit Group and corresponding personalized ICD-Benefit Score

MADIT-ICD Benefit Group	Lowest	Intermediate	High
VT/VF Score	Low (<7)	Low (<7)	High (≥7)
Non-arrhythmic Mortality Score	High (≥3)	Low (<3)	High (≥3)
ICD-Benefit Score	0	13	25
	38	50	63
	75	88	100

<https://is.gd/madit>



Utilisation de l'IRM et la fibrose dans les CMNI

Relationship of LVEF and Myocardial Scar to Long-Term Mortality Risk and Mode of Death in Patients With Nonischemic Cardiomyopathy

Igor Klem, Michael Klein, Mohammad Khan, Eric Y. Yang, Faisal Nabi, Alexander Ivanov, Lubna Bhatti, Brenda Hayes, Edward A. Graviss, Duc T. Nguyen, Robert M. Judd, Raymond J. Kim, John F. Heitner and Dipan J. Shah
Originally published 22 Jan 2021 | <https://doi.org/10.1161/CIRCULATIONAHA.120.048477> | Circulation. 2021;143:1343-1358

Accumulation facteurs de risque augmente le risque de mortalité toutes causes : cicatrice aggrave fortement le pronostic devant la FEVG

1020 patients – Suivi median 5,2 ans

Mort subite augmenté :

- FEVG ≤ 35% et SCAR + X 3,22
- FEVG > 35% et SCAR + X 3,8

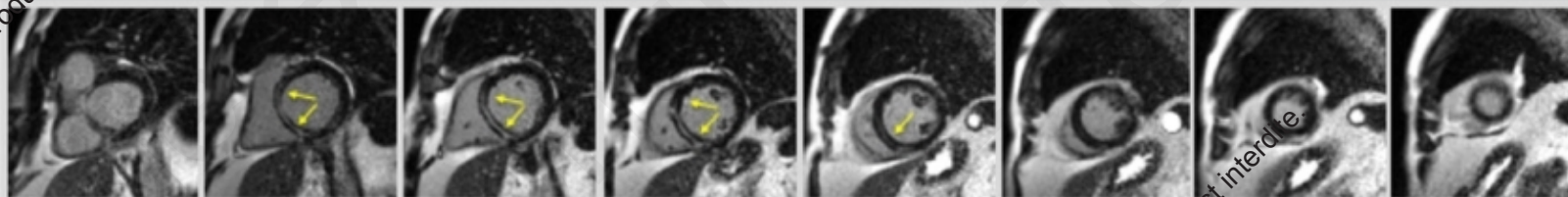
Pronostic plus sombre si :

- FEVG > 35 % SCAR + que
- FEVG ≤ 35% et SCAR -

Arythmies X 4 si macro fibrose

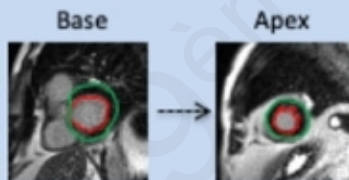
[Klem et al, Circulation. 2021 Apr 6; 143\(14\):1343-1358](https://doi.org/10.1161/CIRCULATIONAHA.120.048477)

Patient with myocardial scar on CMR

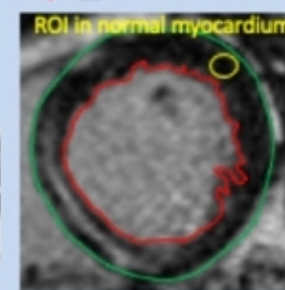


Semi-Automated Scar Quantification

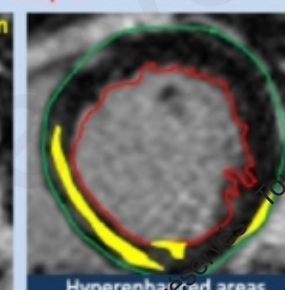
Step 1. Manual contouring endocardial/epicardial borders (stack of short-axis images)



Step 2. Manual ROI



Step 3. Auto Scar Contour



Step 4. Manual Correction

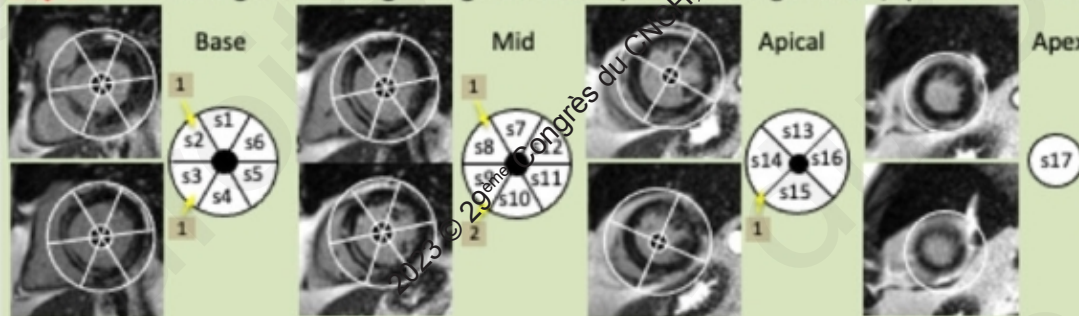


Scar Assessment

- A) Each voxel with signal intensity ≥ 2 SD above mean of normal myocardium considered hyperenhanced.
- B) Manual user correction for blood-pool voxels, epicardial fat, and artifact, if necessary.

Visual Scoring of Scar Extent

Step 1. Visual scoring of Scar using 17-segment model (No contouring of endo-/epicardial borders required)



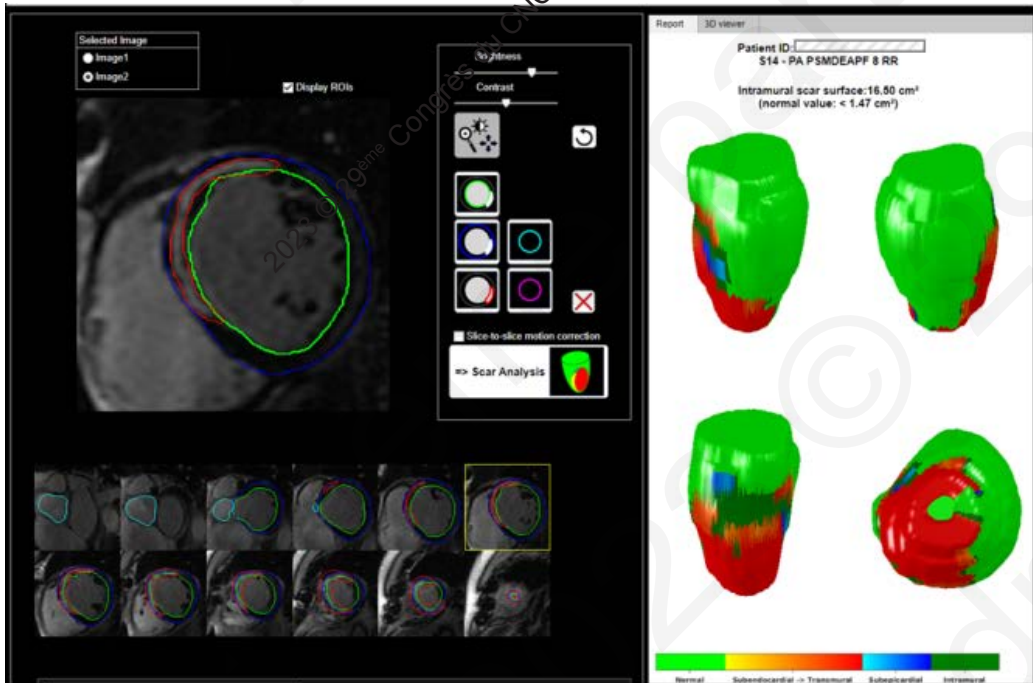
Scores for Scar Area	
0	None
1	1-25%
2	26-50%
3	51-75%
4	76-100%

- A) Scoring of hyperenhanced area, where fully bright regions are included entirely and grey regions are included partly (accounting for the mean signal intensity relative to the brightest scar voxel or the LV blood-pool, whichever is higher).

SMART-DEF Trial

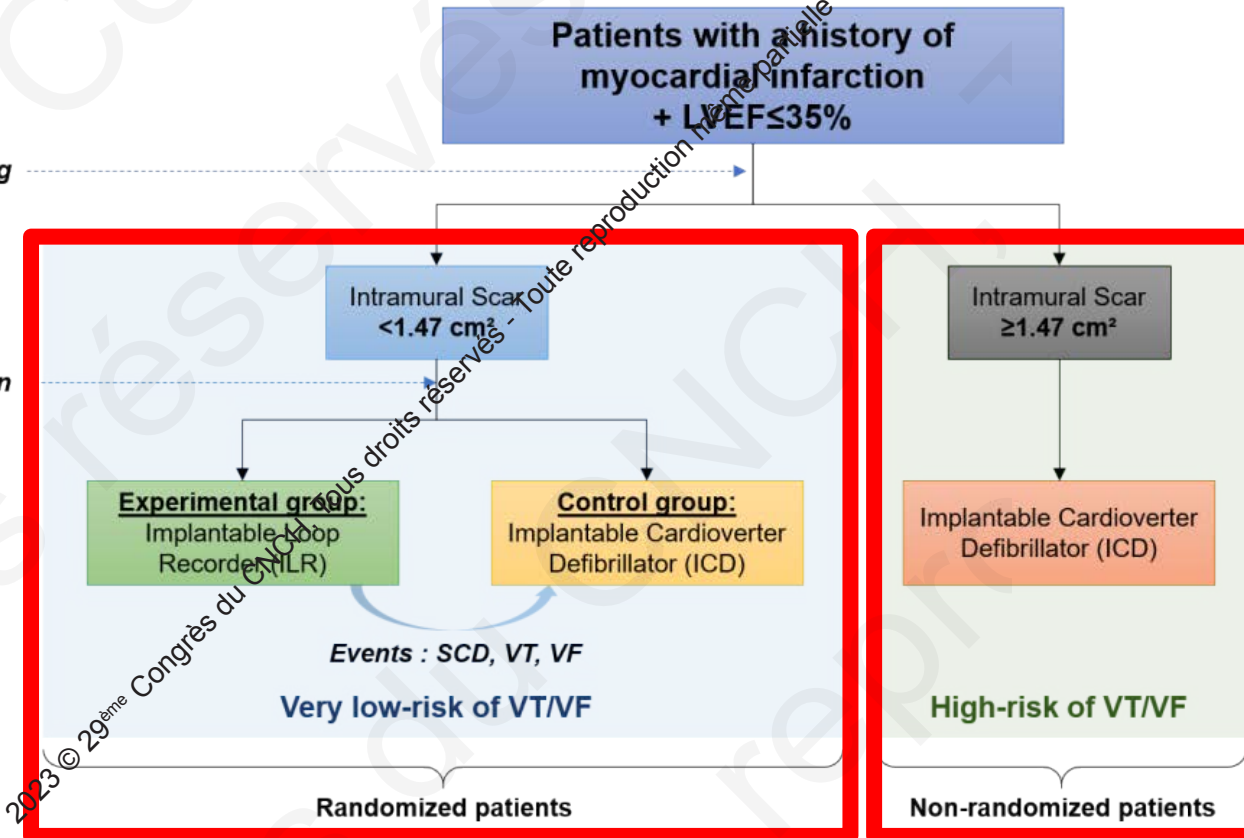
Study Design: non-inferiority, prospective, national*, multi-center, open, randomized, controlled study with an health economic analysis.

Dedicated Software for Scar Geometry Assessment



MRI screening

Randomization



Le défibrillateur portable : ZOLL LifeVest®



Take-Home message

- Baisse de la mort subite grâce au traitement médicamenteux
- Mais taux résiduel pas négligeable
- Surtout pour des patients jeunes
- Surtout si 4 fantastiques pas aux doses cibles
- Meilleurs dispositifs avec moins de complications
- DAI en prévention primaire reste une pierre angulaire de la PEC des patients avec FEVG < 35% (CMI+++)
- Malgré tout il faut continuer à optimiser le screening des patients (IRM, génétique+++)

Merci de votre attention

