L'arrêt cardiaque vu par le rythmologue
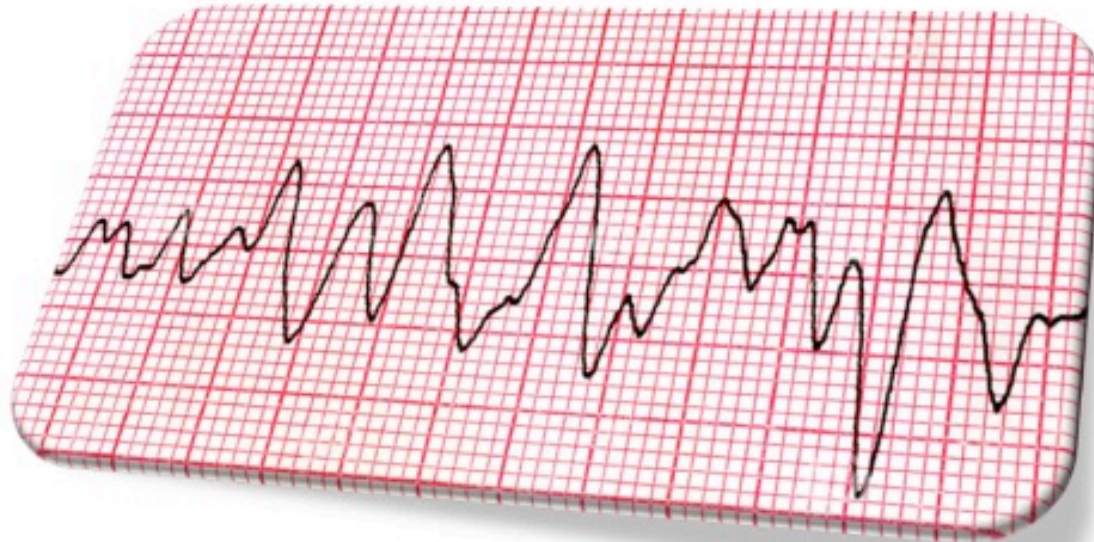
Dr Walid AMARA

Disclosures

◆ Consulting and Speaker's fees from Bayer, BMS, Pfizer, Boehringer Ingelheim, Biotronik, Medtronic, Boston Scientific, Saint Jude Medical, Sorin Group, Novartis, Servier, Astra Zeneca.
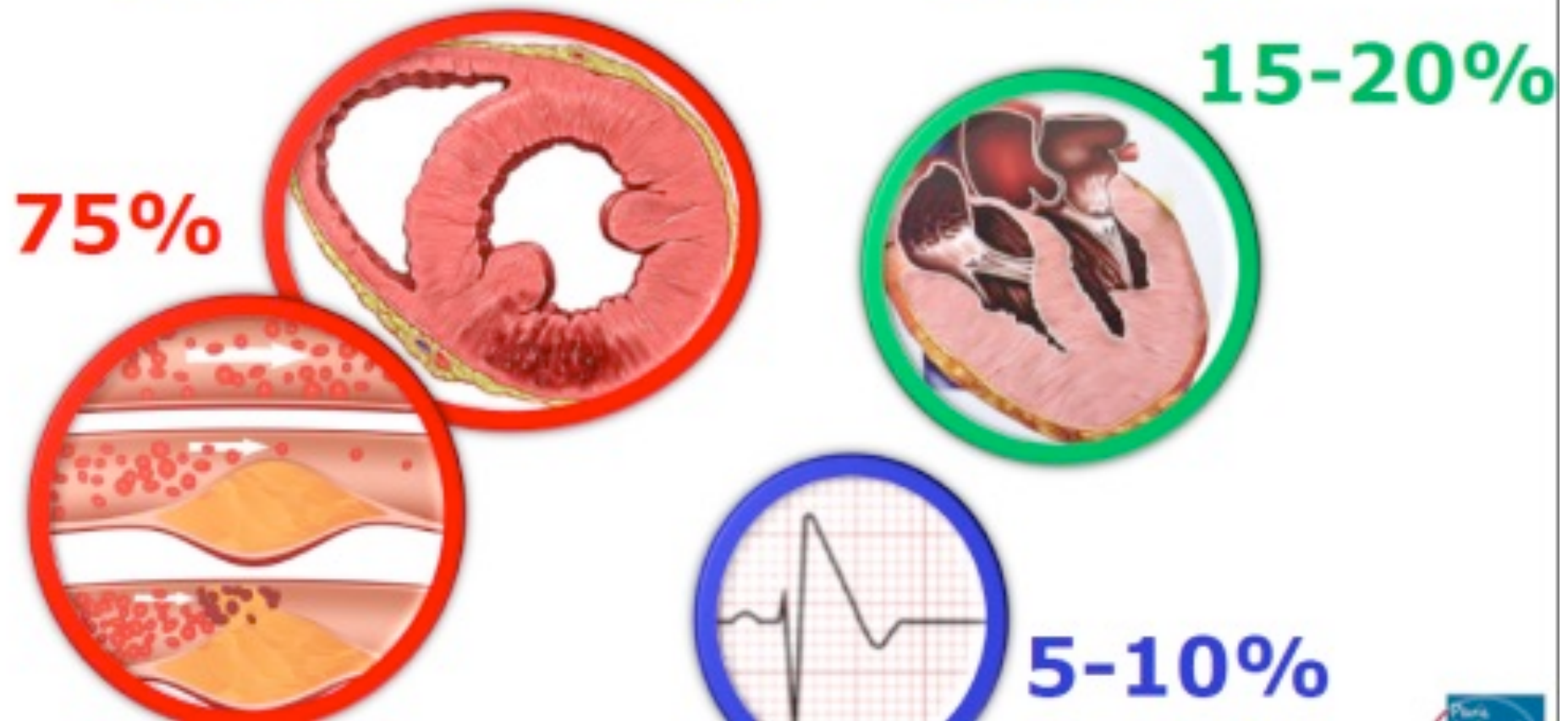
Mort Subite

>80% des cas = Fibrillation Ventriculaire

Bayes de Luna et al. Am Heart J 1989

Une histoire d'infarctus

- Mr Kif Gil né le 11/02/1966
- IDM antérieur vu à H15 le **2 mars 2008**.
- ECG : RS. QS antérieur étendu. QRS 120 ms.
- Coro: occlusion IVA2. ATL Stent. CD dominée petite, sténose marginale distale de petite taille.
- IC . CPBIA 4 jours.
- FE 20%.
- Réadaptation.
- Traitement médicamenteux adapté en hôpital de jour.
- IRM fin mai FE 15%. Pas de thrombus VG.

Pose DAI le 28/05/2008

|	Classe
Patients coronariens sans ou avec symptômes d'insuffisance cardiaque légère ou modérée (classe NYHA II ou III), une FEVG ≤ 30% mesurée au moins 1 mois après un IDM et 3 mois après un geste de revascularisation (chirurgie ou angioplastie)	I

DAI

|	
Weight (g)	50–120
Volume (ml)	30–70
Battery	Lithium–silver vanadium oxide
Capacitors	Aluminum or aluminum chloride electrolytic
Generator can	Titanium
Leads	Transvenous defibrillation coils
	RA, RV, LV sensing and pacing electrodes
	Active can
	Epicardial or subcutaneous patches
Functions	
Ventricle	Shock, RV or BIV sensing, pacing
Atrium	Sensing, pacing (shock)
Estimated battery life (yr)	4 to 9
Estimated costs ($)†	
Device	10,000–40,000 or more
Implantation	6,000–12,000
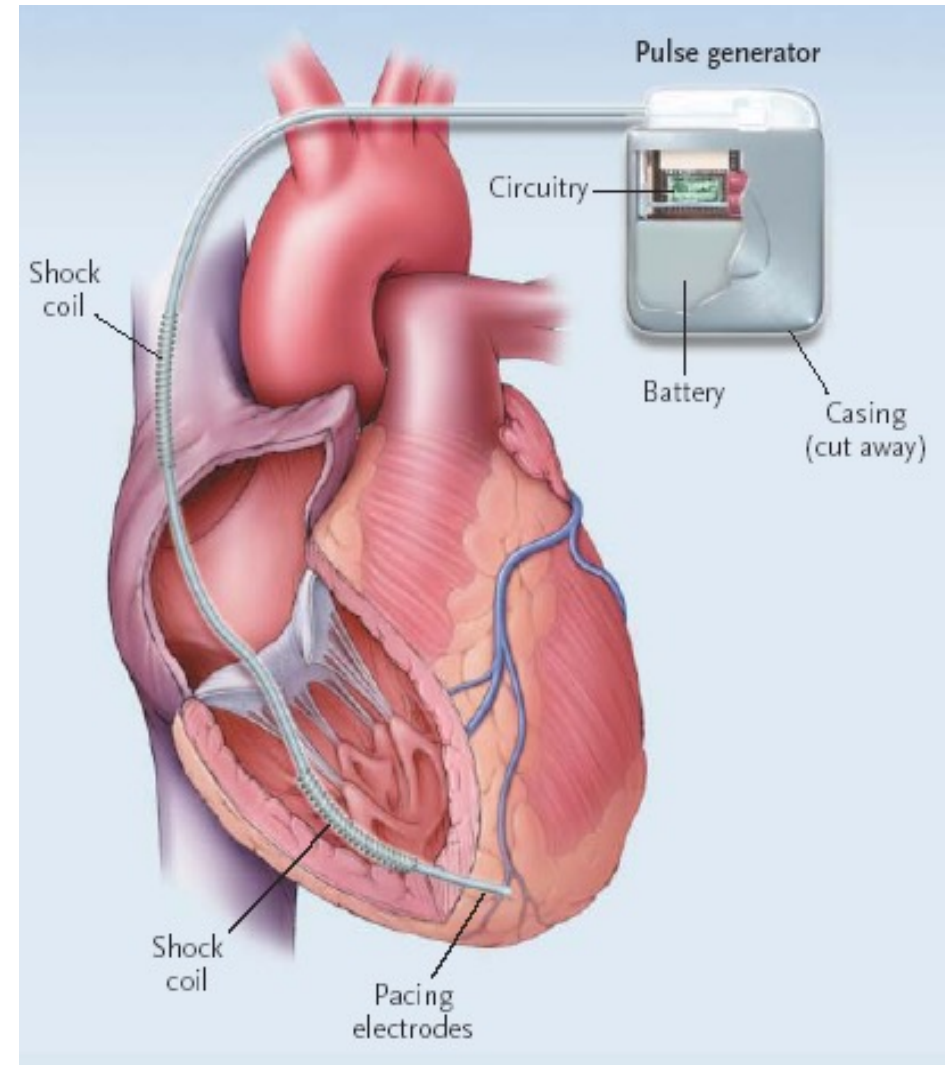
MADIT II:
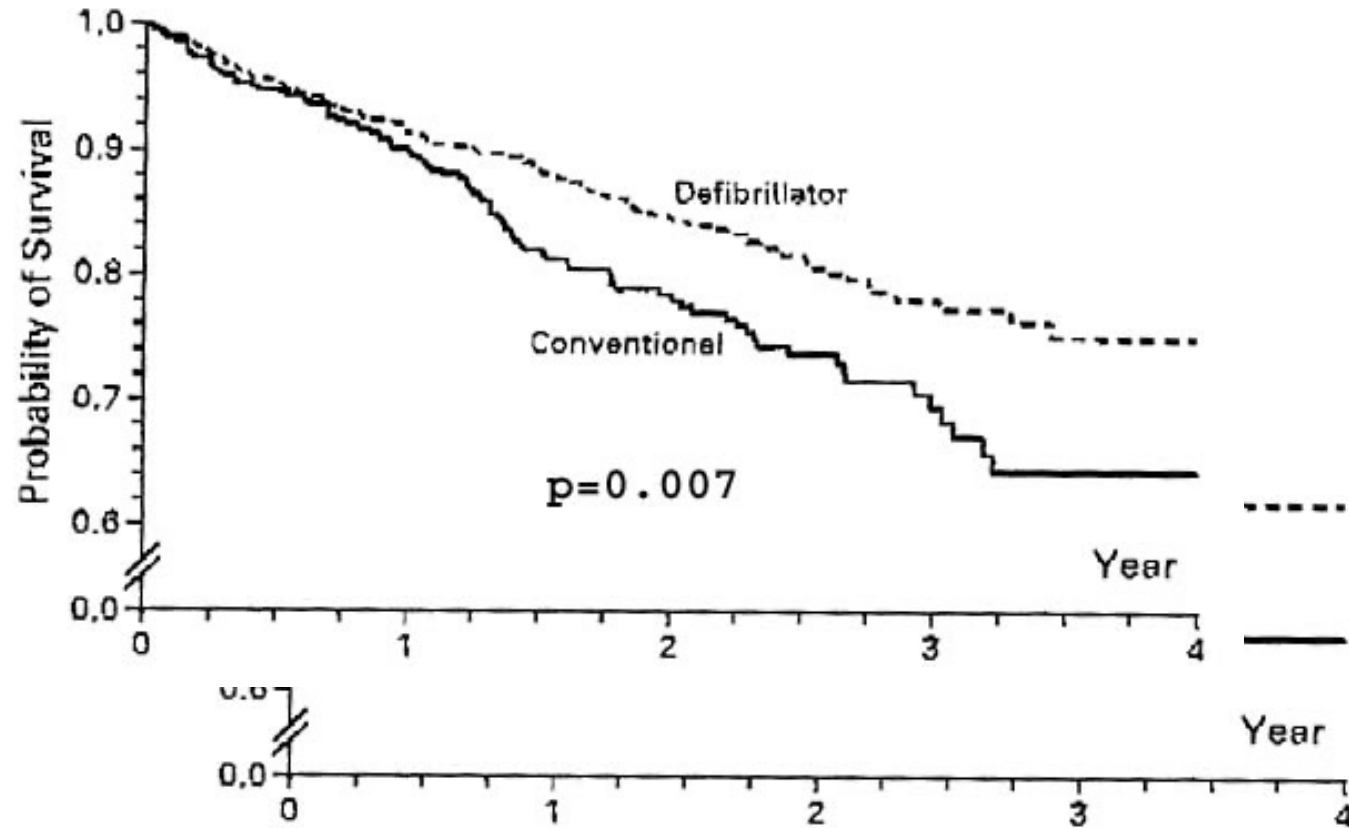
- Les résultats sur la mortalité totale sont probants:
- Le bénéfice apparaît après 18 mois et augmente avec le temps
- A l'arrêt de l'étude, diminution de mortalité de 31%

Moss et al N Engl J Med 2002;346:877

Le 8 juillet 2008
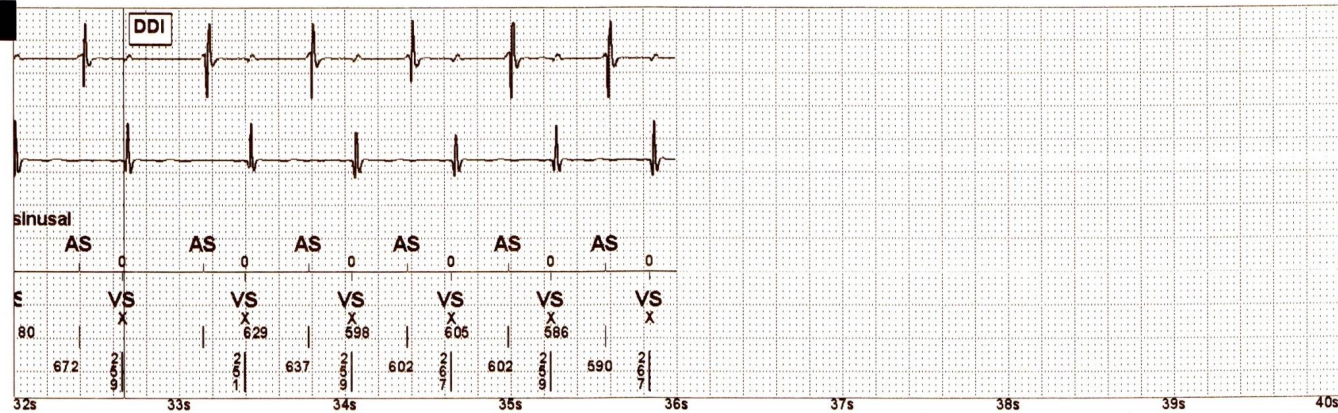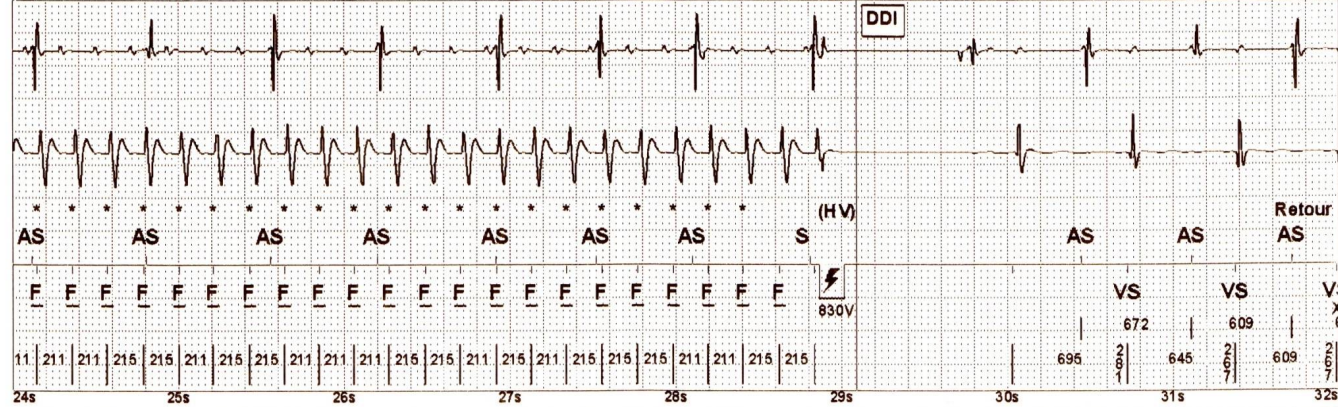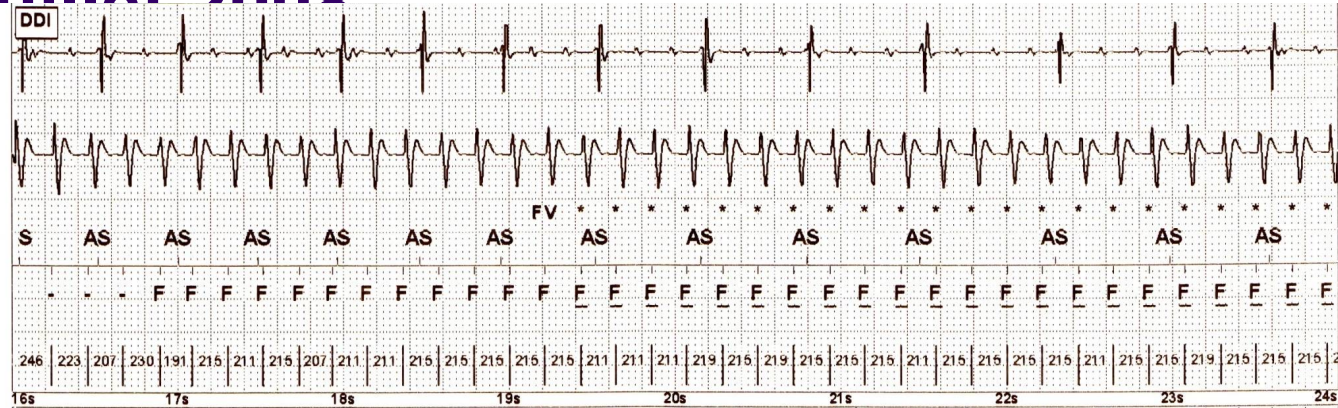
Key Randomized Clinical Trials

ICD therapy for the <u>secondary prevention</u> of SCA

						Mortality (%)		
Trial	N	Age (yrs)	Mean LVEF (%)	Follow-up (mos)	Control Therapy	Control	ICD	P
AVID	1016	65 ± 10	35	18 ± 12	Amiodarone or sotalol	24.0	15.8	.02
CIDS	659	64 ± 9	34	36	Amiodarone	29.6	25.3	.14
CASH	288	58 ± 11	45	57 ± 34	Amiodarone or metoprolol	44.4	36.4	.08

Adapted from: DiMarco JP. *N Engl J Med*. 2003;349:1836-47. www.medscape.com

Young JB. Sudden cardiac death in heart failure. www.medscape.com

Patients with a previous cardiac arrest are at high risk for subsequent SCA events but account for a small percentage of annual sudden deaths
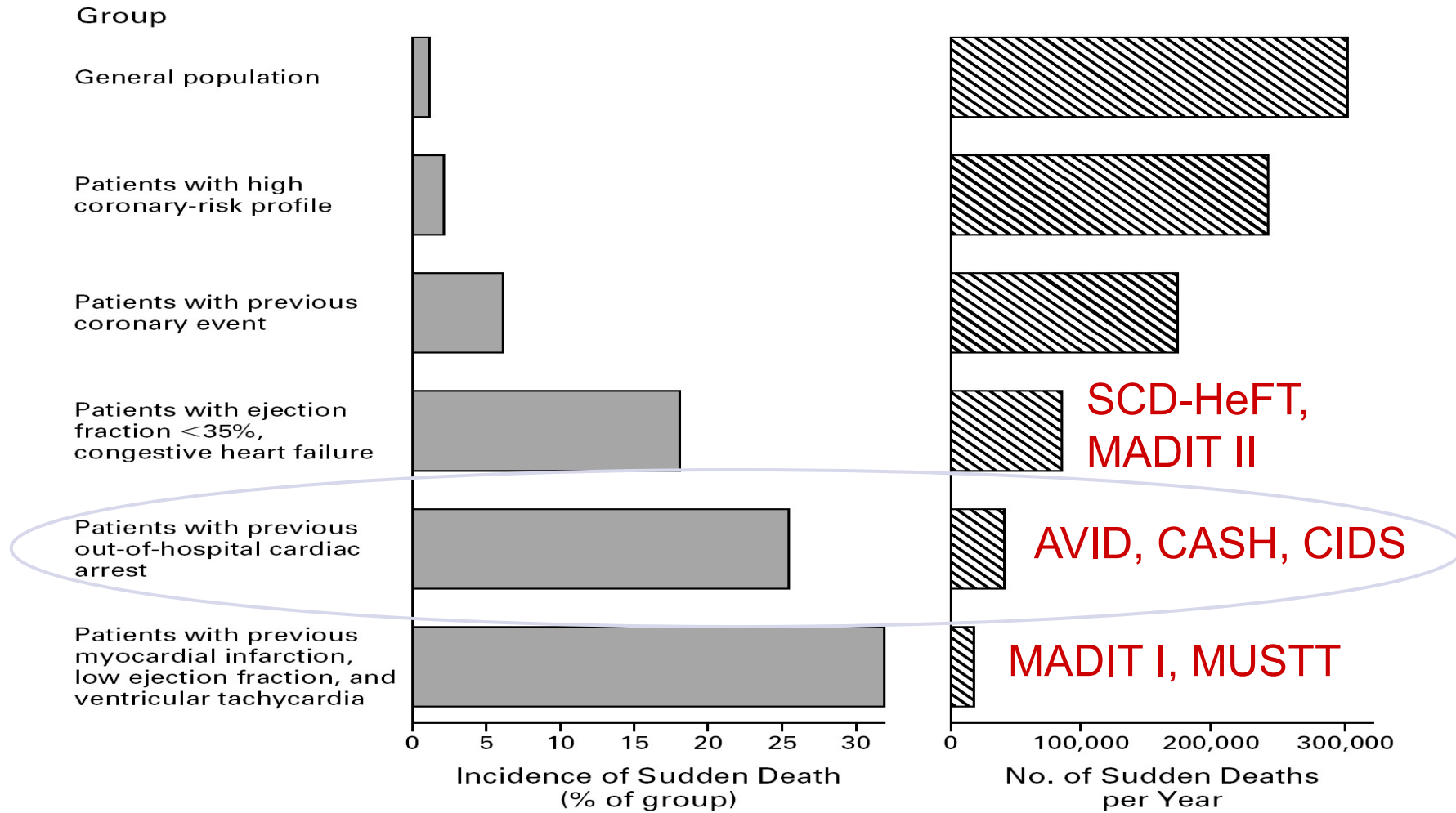
Myerburg RJ, et al. *Circulation*. 1998. 97:1514-1521.

Key Randomized Clinical Trials

ICD therapy for the <u>primary prevention</u> of SCA

Trial	N	Age (yrs)	Mean LVEF (%)	Follow-up (mos)	Control Therapy	Mortality (%)		
						Control	ICD	P
SCD-HeFT	2521	60.1	25	45.5	Optimal Medical Therapy	36.1	28.9	.007
MADIT	196	63 ± 9	26	27	Conventional	38.6	15.7	.009
MADIT II	1232	64 ± 10	23	20	Optimal Medical Therapy	19.8	14.2	.007
MUSTT	704	67 ± 12	30	39	No EP-guided therapy	48	24	.06
DEFINITE	458	58	21	29.0±14.4	Optimal Medical Therapy	14.1	7.9	.08

Adapted from: DiMarco JP. *N Engl J Med.* 2003;349:1836-47. www.medscape.com
Kadish A, et.al. *N Engl J Med* 2004;350:2151-8.
Young JB. Sudden cardiac death in heart failure. www.medscape.com

ESC 2016

Therapies for patients with LV dysfunction with or without heart failure
- Primary prevention of sudden cardiac death

Implantable cardioverter defibrillator implant in patients ventricular dysfunction		
Recommendations		
ICD therapy is recommended, to reduce SCD in patients with symptomatic HF (NYHA Class II-III) and LVEF ≤35%, after ≥3 months of optimal medical therapy, who are expected to survive at least 1 year with good functional status:		
• Ischaemic aetiology (at least 6 weeks after myocardial infarction).	I	A
• Non-ischaemic aetiology.	I	B

ICD for primary prevention of SCD – Same Class I Recommendation.

2 large trials: primary prevention of SCD by ICD in patients with HF and reduced LVEF.

SCD-HeFT; ICD 23% decreased risk of death, 7% absolute decrease in mortality after 5 yrs (from 29% -22%).

DEFINITE trial; mortality reduced by 35% in ICD group (HR 0.65; P=0.08).

ESC 2016

Early after myocardial infarction

| Timing of ICD placement after myocardial infarction related to left ventricular ejection fraction before and after discharge		
Recommendations		
Early (before discharge) assessment of LVEF is recommended in patients with acute myocardial infarction.		
Re-evaluation of LVEF 6–12 weeks after myocardial infarction is recommended to assess the potential need for primary prevention ICD implantation.	I	C

> **NEW!**
> Re-assess LVEF 6-12 w post MI:
> - identify need for primary preventive ICD
> - avoid unnecessary ICDs

- LVEF should be assessed 6–12 weeks after MI in stable patients; optimized on HF medication to assess potential indication for primary preventive ICD.
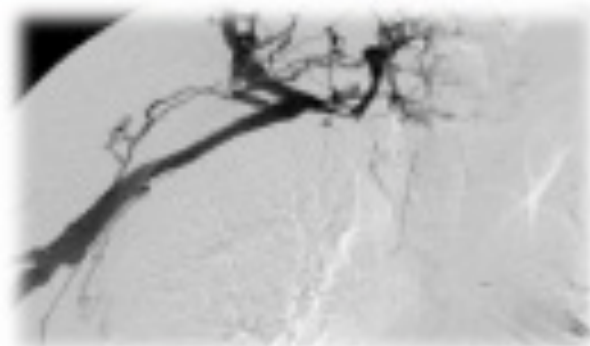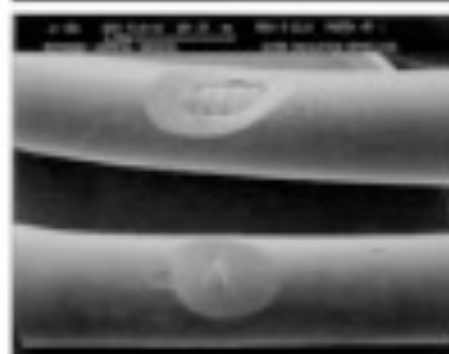
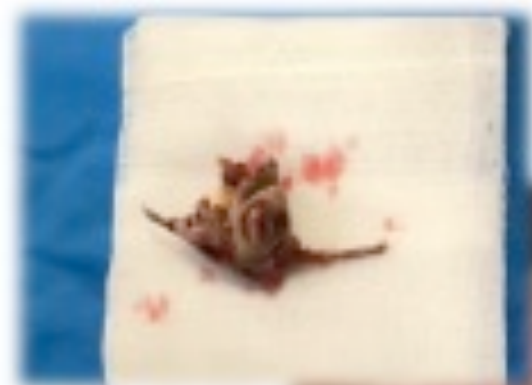- This evaluation should be **structured and offered to all patients.**
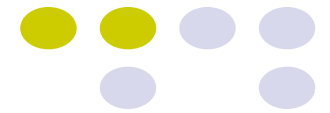
Stratification du Risque
3 Difficultés pour le Rythmologue...
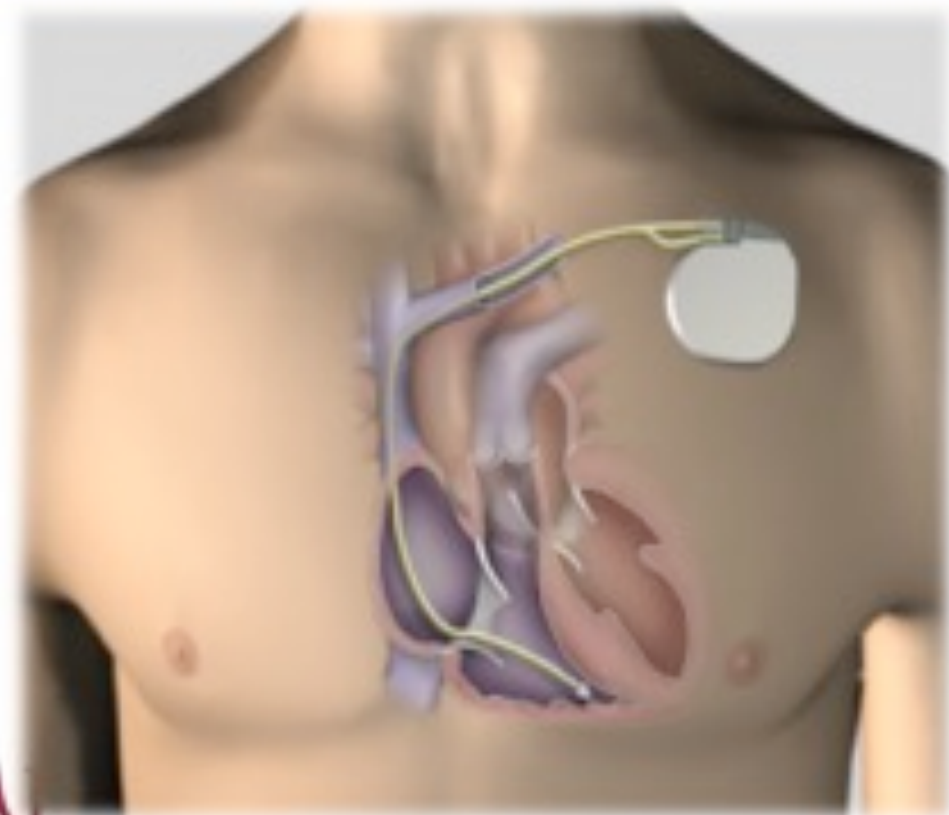

Une Majorité Survient en Population Générale

Stratification du Risque
3 Difficultés pour le Rythmologue...

ProblèmeS liés
Au Défibrillateur

Lutter Contre la Mort Subite

```
                    ┌──────────────────────────┐
          ┌─────────┴─────────┐    ┌────────────┴────────────┐
      │   Diminuer   │            │   Améliorer   │
      │   Survenue   │            │    Survie     │
      └──────┬───────┘            └───────────────┘
    ┌────────┴────────┐
```

Prévenir Maladie Coronaire

Stratification Du Risque

☐ **Stratification affinée (?)**
☐ **Nouveaux outils**
☐ **Nouvelle approche (?)**

QT dispersion
TWA...

SUBSTRATE

LVEF
QRS
SAECG, imagery
EPS...

HR
HRV
BRS...

AUTONOMIC
NERVOUS
SYSTEM

TRIGGER

VPB/ NSVT...
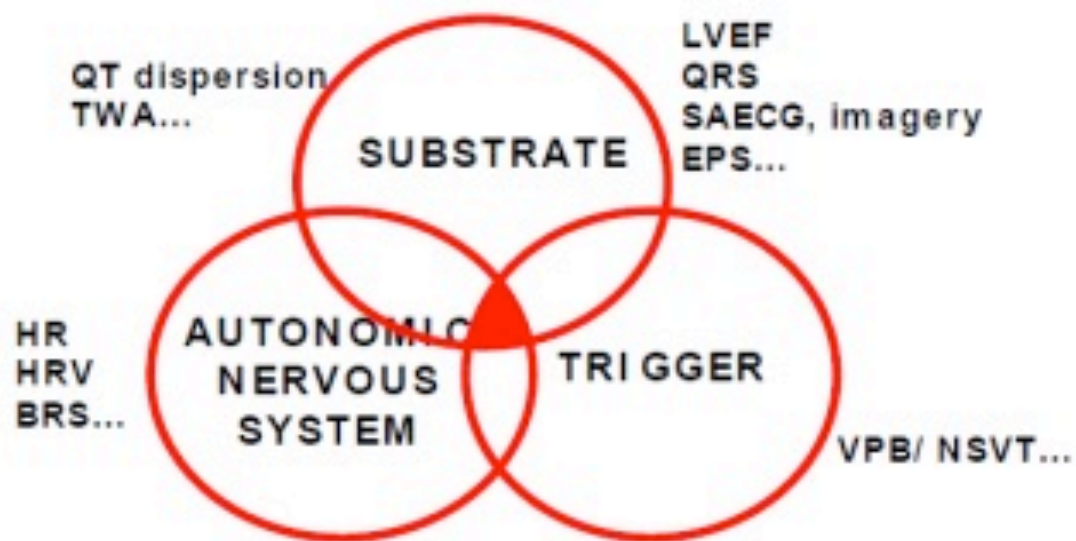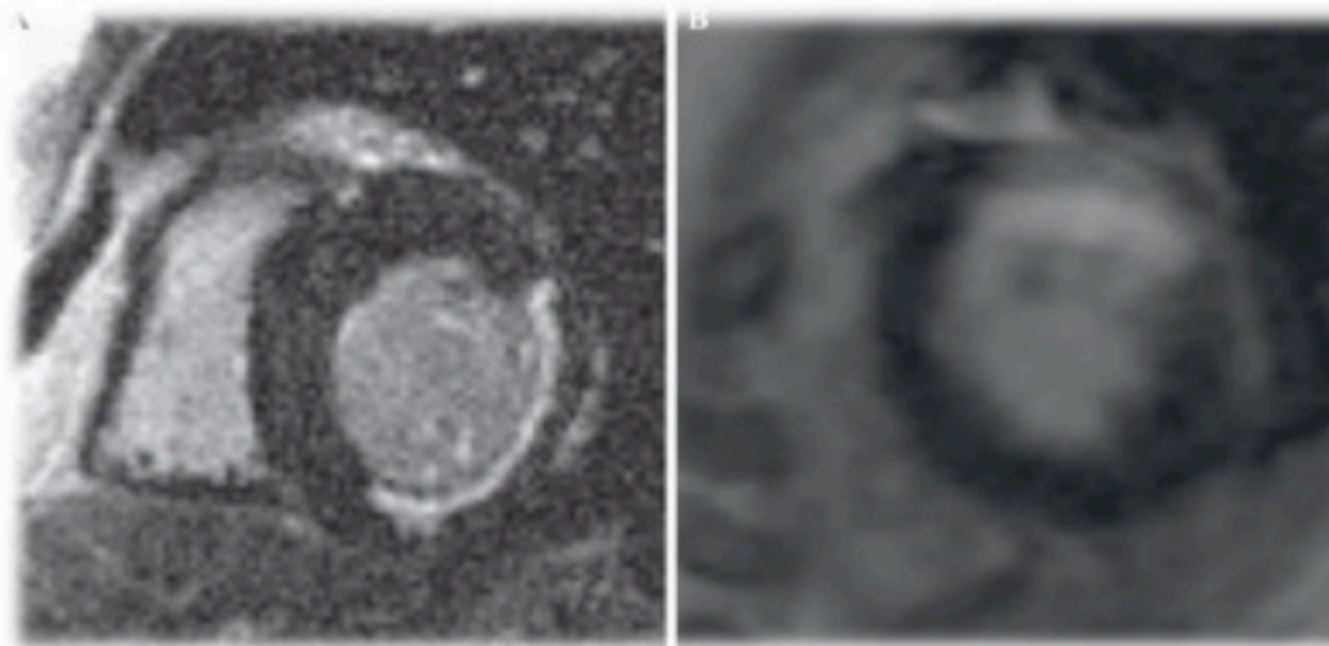
**Re-test « old hypotheses »
with continuous monitoring
and softwares (using ICD)??
(TWA, HRV...)
New Imagery/mapping?
(fibrosis)**

Nouvelle approche?

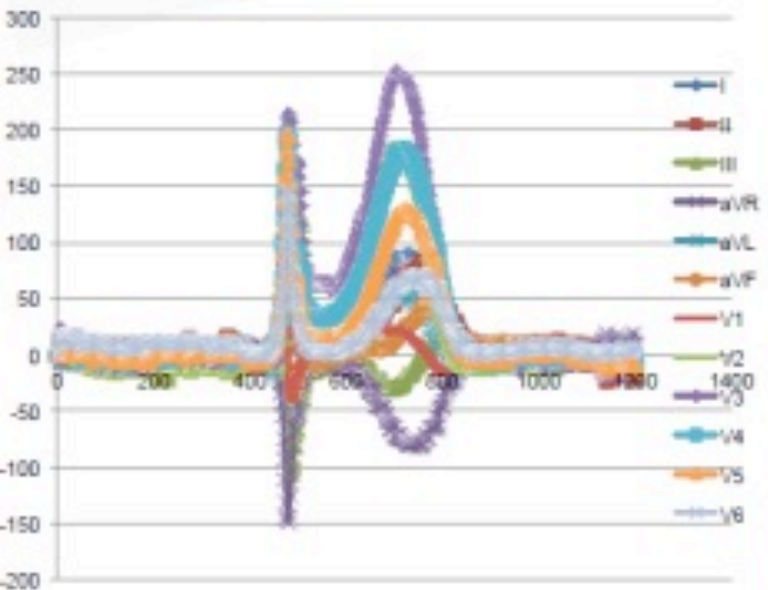**Peut-on Identifier des Sujets à Risque Imminent de Mort Subite ?** **[« Near-Term Prevention »]**
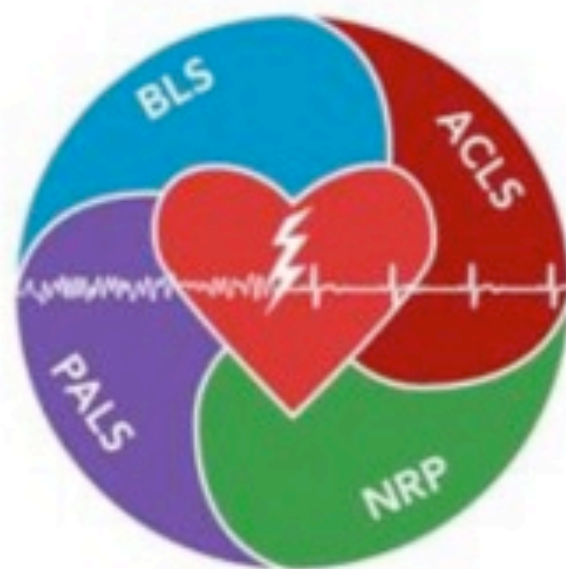
La Mort Subite du Sportif
un Exemple Didactique à Utiliser...

Screening ECG

Education

Prise en charge de l'ACR

2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

The Task Force for the Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC)

Endorsed by: Association for European Paediatric and Congenital Cardiology (AEPC)

Authors/Task Force Members: Silvia G. Priori*(Chairperson) (Italy)
Carina Blomström-Lundqvist*(Co-chairperson) (Sweden) Andrea Mazzanti[†] (Italy), Nico Blom[a] (The Netherlands), Martin Borggrefe (Germany), John Camm (UK), Perry Mark Elliott (UK), Donna Fitzsimons (UK), Robert Hatala (Slovakia), Gerhard Hindricks (Germany), Paulus Kirchhof (UK/Germany), Keld Kjeldsen (Denmark), Karl-Heinz Kuck (Germany), Antonio Hernandez-Madrid (Spain), Nikolaos Nikolaou (Greece), Tone M. Norekvål (Norway), Christian Spaulding (France), and Dirk J. Van Veldhuisen (The Netherlands)

Indications for autopsy and molecular autopsy in sudden death victims

Recommendations	Class[a]	Level[b]	Ref.[c]
An autopsy is recommended to investigate the causes of sudden death and to define whether SCD is secondary to arrhythmic or non-arrhythmic mechanisms (e.g. rupture of an aortic aneurysm).	I	C	17
Whenever an autopsy is performed, a standard histological examination of the heart is recommended and it should include mapped labelled blocks of myocardium from representative transverse slices of both ventricles.	I	C	17
The analysis of blood and other adequately collected body fluids for toxicology and molecular pathology is recommended in all victims of unexplained sudden death.	I	C	17
Targeted post-mortem genetic analysis of potentially disease-causing genes should be considered in all sudden death victims in whom a specific inheritable channelopathy or cardiomyopathy is suspected.	IIa	C	17,50, 51

Table 4 Diagnostic approach for family members of sudden unexplained death syndrome or sudden arrhythmic death syndrome victims

Approach	Action[a]
History taking and physical examination	• Personal clinical history • Family history focused on cardiac diseases or sudden deaths
ECG	• Baseline 12-lead ECG with standard and high precordial leads • 24-hour ambulatory ECG • Exercise stress test • Signal-averaged ECG • Provocative test with ajmaline/flecainide (when Brugada syndrome is suspected)
Cardiac imaging	• Two-dimensional echocardiography and/or CMR (with or without contrast)
Genetic testing	• Targeted molecular testing and genetic counselling if there is the clinical suspicion of a specific disease • Referral to a tertiary centre specialized in evaluation of the genetics of arrhythmias

CMR = cardiac magnetic resonance; ECG = electrocardiogram.
[a]The recommendations in this table are based on the consensus of this panel of experts and not on evidence-based data.

Catheter ablation for the treatment of sustained monomorphic ventricular tachycardia

Recommendations	Class[a]	Level[b]	Ref.[c]
Urgent catheter ablation is recommended in patients with scar-related heart disease presenting with incessant VT or electrical storm.	I	B	183
Catheter ablation is recommended in patients with ischaemic heart disease and recurrent ICD shocks due to sustained VT.	I	B	184–186
Catheter ablation should be considered after a first episode of sustained VT in patients with ischaemic heart disease and an ICD.	IIa	B	184–186

ICD = implantable cardioverter defibrillator; VT = ventricular tachycardia.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

Prevention of ventricular tachycardia recurrences in patients with left ventricular dysfunction and sustained ventricular tachycardia

Recommendations	Class[a]	Level[b]	Ref.[c]
Urgent catheter ablation in specialized or experienced centres is recommended in patients presenting with incessant VT or electrical storm resulting in ICD shocks.	I	B	183
Amiodarone or catheter ablation is recommended in patients with recurrent ICD shocks due to sustained VT.	I	B	64,156, 184– 186
ICD implantation is recommended in patients undergoing catheter ablation whenever they satisfy eligibility criteria for ICD.	I	C	This panel of experts

Risk stratification and management in Brugada Syndrome

Recommendations	Class[a]	Level[b]	Ref.[c]
The following lifestyle changes are recommended in all patients with a diagnosis of Brugada syndrome: (a) Avoidance of drugs that may induce ST-segment elevation in right precordial leads (http:// www.brugadadrugs.org) (b) Avoidance of excessive alcohol intake and large meals (c) Prompt treatment of any fever with antipyretic drugs.	I	C	This panel of experts
ICD implantation is recommended in patients with a diagnosis of Brugada syndrome who (a) Are survivors of an aborted cardiac arrest and/or (b) Have documented spontaneous sustained VT.	I	C	451
ICD implantation should be considered in patients with a spontaneous diagnostic type I ECG pattern and history of syncope.	IIa	C	451
Quinidine or isoproterenol should be considered in patients with Brugada syndrome to treat electrical storms.	IIa	C	453
Quinidine should be considered in patients who qualify for an ICD but present a contraindication or refuse it and in patients who require treatment for supraventricular arrhythmias.	IIa	C	454
ICD implantation may be considered in patients with a diagnosis of Brugada syndrome who develop VF during PVS with two or three extrastimuli at two sites.	IIb	C	120
Catheter ablation may be considered in patients with a history of electrical storms or repeated appropriate ICD shocks.	IIb	C	201, 455