

11° CONGRESSO NAZIONALE



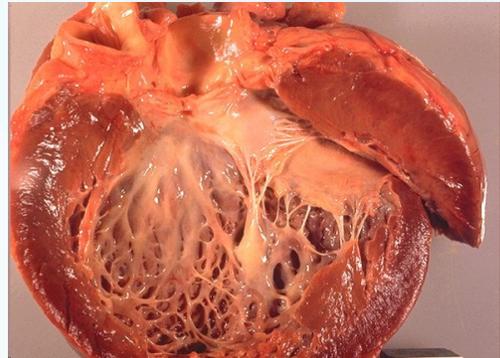
*Quello che le Linee
Guida Non Dicono*

Napoli
5-6 aprile 2024

S-ICD nelle Cardiomiopatie: update 2024

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ESC

European Society
of Cardiology

European Heart Journal (2023) 44, 3503–3626
<https://doi.org/10.1093/eurheartj/ehad194>

ESC GUIDELINES

2023 ESC Guidelines for the management of cardiomyopathies

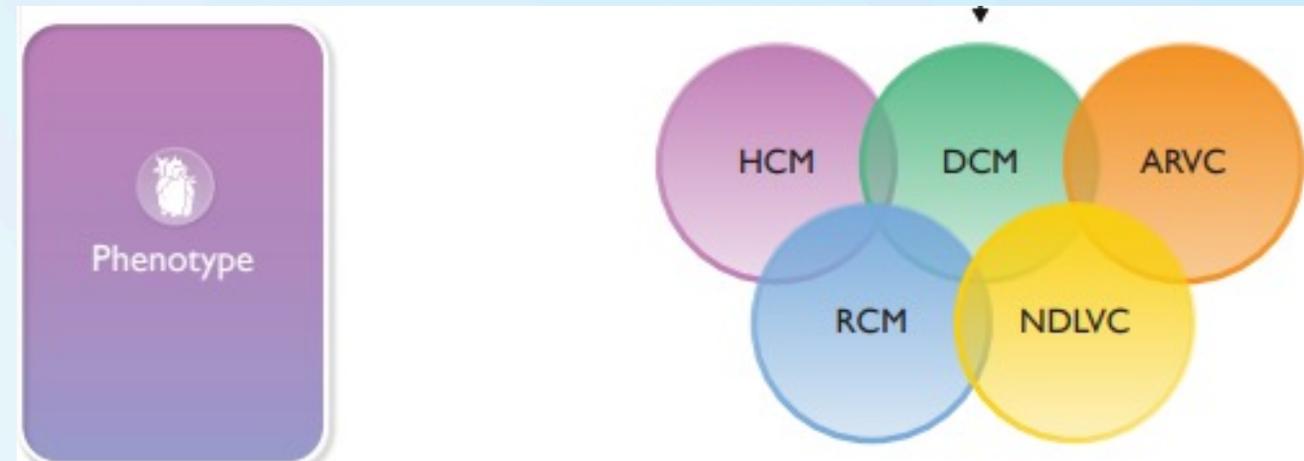
Developed by the task force on the management of
cardiomyopathies of the European Society of Cardiology (ESC)



3.1. Definitions

A cardiomyopathy is defined as 'a myocardial disorder in which the heart muscle is structurally and functionally abnormal, in the absence of coronary artery disease (CAD), hypertension, valvular disease, and congenital heart disease (CHD) sufficient to cause the observed myocardial abnormality'.² This definition applies to both children and

Classificazione dei fenotipi



2023 ESC Guidelines for the management of cardiomyopathies

Developed by the task force on the management of cardiomyopathies of the European Society of Cardiology (ESC)

ICD nei pazienti con cardiomiopatie

Recommendation Table 12 — Recommendations for implantable cardioverter defibrillator in patients with cardiomyopathy

Recommendations	Class ^a	Level ^b
General recommendations		
Implantation of a cardioverter defibrillator is only recommended in patients who have an expectation of <u>good quality survival >1 year.</u>	I	C
It is recommended that ICD implantation be guided by <u>shared decision-making that:</u>	I	C
<ul style="list-style-type: none"> is evidence-based; considers a person's individual preferences, beliefs, circumstances, and values; and ensures that the person understands the benefits, harms, and possible consequences of different treatment options.^c 		
It is recommended that prior to ICD implantation, patients are counselled on the risk of <u>inappropriate shocks, implant complications, and the social, occupational, and driving implications of the device.</u>	I	C
It is <u>not recommended to implant an ICD in patients with incessant ventricular arrhythmias until the ventricular arrhythmia is controlled.</u>	III	C

Primary prevention

Comprehensive SCD risk stratification is recommended in all cardiomyopathy patients who have not suffered a previous cardiac arrest/sustained ventricular arrhythmia at initial evaluation and at 1–2 year intervals, or whenever there is a change in clinical status.	I	C
The use of validated SCD algorithms/scores as aids to the shared decision-making when offering ICD implantation, where available: ^e		
• is recommended in patients with HCM. ^{81,525,535}	I	B
• should be considered in patients with DCM, NDLVC, and ARVC. ^{185,186,524,526,536–542}	IIa	B
If a patient with cardiomyopathy requires pacemaker implantation, comprehensive SCD risk stratification to evaluate the need for ICD implantation should be considered.	IIa	C

Choice of ICD

When an ICD is indicated, it is recommended to evaluate whether the patient could benefit from CRT. ⁵³³	I	A
Subcutaneous defibrillators should be considered as an alternative to transvenous defibrillators in patients with an indication for an ICD when pacing therapy for bradycardia, cardiac resynchronization, or antitachycardia pacing is not anticipated. ⁵⁴³	IIa	B
The wearable cardioverter defibrillator should be considered for adult patients with a secondary prevention ICD indication who are temporarily not candidates for ICD implantation.	IIa	C

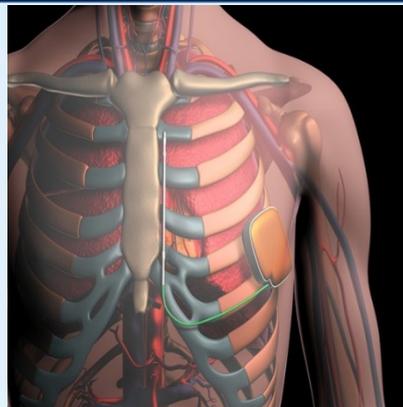
Secondary prevention

Implantation of an ICD is recommended: ^d		
• in patients with HCM, DCM, and ARVC who have survived a cardiac arrest due to VT or VF, or who have spontaneous sustained ventricular arrhythmia causing syncope or haemodynamic compromise in the absence of reversible causes. ^{528–534}	I	B
• in patients with NDLVC and RCM who have survived a cardiac arrest due to VT or VF, or who have spontaneous sustained ventricular arrhythmia causing syncope or haemodynamic compromise in the absence of reversible causes.	I	C
ICD implantation should be considered in patients with cardiomyopathy presenting with haemodynamically tolerated VT, in the absence of reversible causes.	IIa	C

AHA/ACC/HRS GUIDELINE

2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society



European Heart Journal (2015) 36, 2793–2867
doi:10.1093/eurheartj/ehv316

ESC GUIDELINES

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)

Recommendations for Subcutaneous Implantable Cardioverter-Defibrillator		
References that support the recommendations are summarized in Online Data Supplement 55.		
COR	LOE	Recommendations
I	B-NR	1. In patients who meet criteria for an ICD who have inadequate vascular access or are at high risk for infection, and in whom pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated, a subcutaneous implantable cardioverter-defibrillator is recommended. ^{511.1.1-511.1.5}
IIa	B-NR	2. In patients who meet indication for an ICD, implantation of a subcutaneous implantable cardioverter-defibrillator is reasonable if pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated. ^{511.1.1-511.1.4}
III: Harm	B-NR	3. In patients with an indication for bradycardia pacing or CRT, or for whom antitachycardia pacing for VT termination is required, a subcutaneous implantable cardioverter-defibrillator should not be implanted. ^{511.1.1-511.1.4,511.1.6-511.1.8}

Subcutaneous implantable cardioverter defibrillator

Recommendations	Class ^a	Level ^b	Ref. ^c
Subcutaneous defibrillators should be considered as an alternative to transvenous defibrillators in patients with an indication for an ICD when pacing therapy for bradycardia support, cardiac resynchronization or antitachycardia pacing is not needed.	IIa	C	157, 158
The subcutaneous ICD may be considered as a useful alternative to the transvenous ICD system when venous access is difficult, after the removal of a transvenous ICD for infections or in young patients with a long-term need for ICD therapy.	IIb	C	This panel of experts

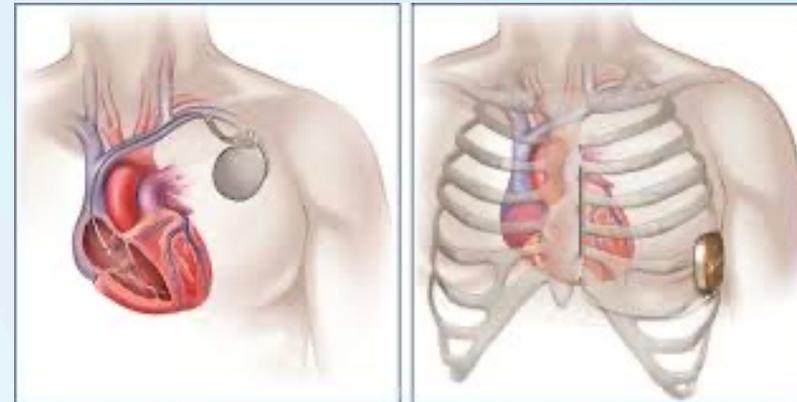
Linea guida	Linee guida 2017 AHA/ACC/HRS ¹⁹	Linee guida 2015 ESC ³⁴	Per pazienti con ICD...
Classe I	✓		Con elevato rischio di infezione, inclusi i pazienti diabetici (fino al 35 % della popolazione ICD) ¹⁹
Classe IIa	✓	✓	<u>Senza necessità di stimolazione</u> (CRT, antibradicardica, ATP)

DUE TIPOLOGIE DI ICD DISPONIBILI

Da oltre 30 anni, lo strumento più efficace nella prevenzione della morte cardiaca improvvisa è rappresentato dal **Defibrillatore Automatico Impiantabile**

Gli ICD attualmente disponibili sono di due tipologie:

- **ICD transvenoso (TV ICD)**
- **ICD sottocutaneo (S-ICD)**



ICD sottocutaneo (S-ICD)

- Non prevede l'introduzione di elettrocateretri attraverso il sistema venoso, ma tutto l'impianto è extravascolare.
- L'elettrocaterete posizionato al di sopra dello sterno è dotato di un coil di defibrillazione, non in grado di effettuare pacing.
- La cassa viene posizionata in corrispondenza della linea medio-ascellare, in tasca intermuscolare.



Protezione senza toccare il cuore

Equivalenza in termini di efficacia (S-ICD/TV-ICD)

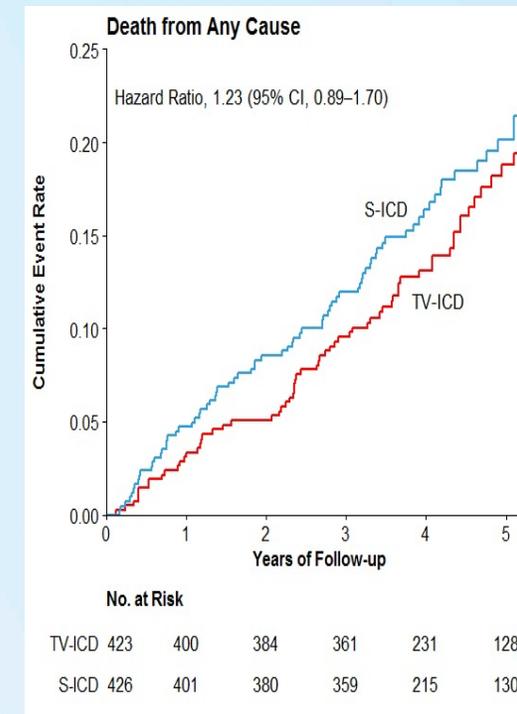
- Dal punto di vista dell'efficacia di defibrillazione, i due dispositivi si sono dimostrati equivalenti, nonostante le energie erogate siano di diversa entità
- I due dispositivi si sono dimostrati comparabili se analizziamo l'endpoint di morte per ogni causa

	S-ICD (n = 426)	TV-ICD (n = 423)
Death from any cause	83 (16.4%)	68 (13.1%)
– Sudden cardiac death	18	18
– Other cardiovascular death	34	28
– Noncardiovascular death	31	22

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Subcutaneous or Transvenous Defibrillator Therapy



Complicanze associate ai TV-ICD

Le complicanze acute e croniche associate al TV-ICD sono più diffuse di quanto in genere riconosciuto¹

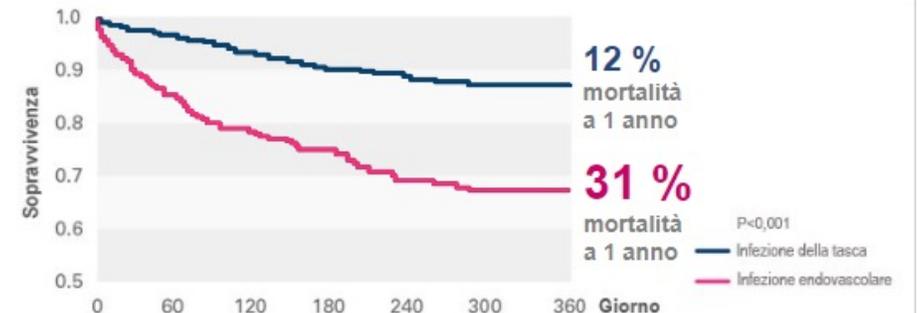
Rischio di complicanze¹ a 6 anni:^{2,4}



La maggior parte delle complicanze¹ è causata da:^{1,5}

Infezione
Malfunzionamento dell'elettrocattetere

Sopravvivenza a 1 anno nei pazienti TV-ICD con infezione della tasca o infezione endovascolare a seguito della rimozione del sistema TV-ICD¹³



Numero di pazienti a rischio

Tasca	289	270	258	245	238	232	230
Endovascolare	213	175	159	149	137	132	130

Le infezioni endovascolari erano associate a un rischio 3 volte maggiore di morte rispetto alle infezioni della tasca^{13,20}

S-ICD : WHY

EFFORTLESS registry

1000 PATIENTS OVER **3** YEARS, **2009**

- Zer0 ENDOVASCULAR INFECTIONS¹
- Zer0 SYSTEMIC INFECTIONS¹
- Zer0 ELECTRODE FAILURES¹

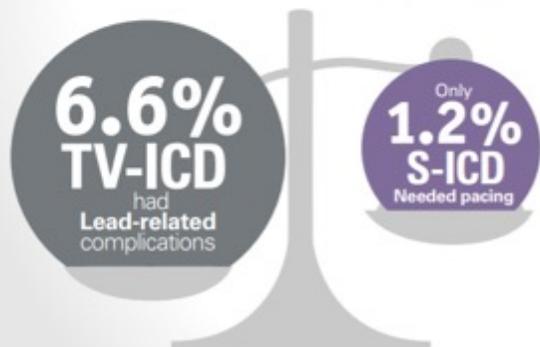
The PRAETORIAN Trial¹

2020

Significantly fewer lead-related complications

- ✓ 6.6% (n=24) in the TV-ICD arm vs
- ✓ 1.4% (n=5) in the S-ICD arm (P=0.001)

Lead complications requiring intervention more common than developing a need for pacing or ATP

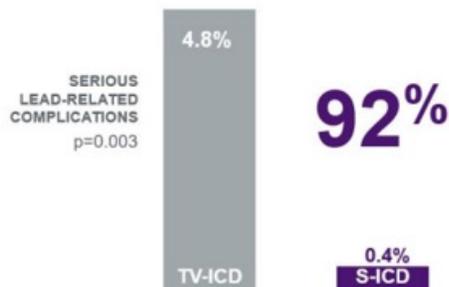


ATLAS Results S-ICD is superior to TV-ICD

Boston Scientific
Advancing science for life™

ATLAS randomized controlled trial shows S-ICD is superior to TV-ICD in serious lead-related complication rates.^{1*}

2022



*In the ATLAS trial, serious complications were defined as moderate-severe or severe bicuspid regurgitation, hemothorax/pneumothorax, cardiac perforation, tamponade, pericardial effusion or pericarditis, unilateral upper extremity deep vein thrombosis and lead dislodgement or loss of sensing or pacing requiring revision.

UNTOUCHED STUDY

1 year rate IAS TV-ICD vs S-ICD **2020**



S-ICD: **Rischio** di **complicanze correlate all' elettrocattetero** **significativamente più basso** con simile tasso di shock inappropriati e simile efficacia di defibrillazione

2019 HRS expert consensus statement on evaluation, risk stratification, and management of arrhythmogenic cardiomyopathy

- ▶ Displasia aritmogena del ventricolo destro e sinistro
- ▶ Amiloidosi
- ▶ Sarcoidosi
- ▶ Miocardio non compatto
- ▶ Anomalie dei canali ionici
(S. di Brugada, S. del QT lungo, S. del QT corto)
- ▶ Chagas disease



*Comprende tutti quei
disordini aritmogeni
del miocardio non
secondari a patologia
ischemica,
ipertensiva, valvolare*

2019 HRS expert consensus statement on evaluation, risk stratification, and management of arrhythmogenic cardiomyopathy

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Né il Consensus HRS 2019, né le LG ESC 2023, si esprimono sul device più appropriato per la prevenzione della MI in questa categoria di pz



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Cardiomiopatia aritmogena del ventricolo destro e sinistro: indicazione ad impianto di ICD

Recommendation Table 29 — Recommendations for sudden cardiac death prevention in patients with arrhythmogenic right ventricular cardiomyopathy

Recommendations	Class ^a	Level ^b
Secondary prevention		
An ICD is recommended to reduce the risk of sudden death and all-cause mortality in patients with ARVC who have survived a cardiac arrest or have recovered from a ventricular arrhythmia causing haemodynamic instability. ^{939,943,944,948,949}	I	A
An ICD should be considered in ARVC patients who have suffered a haemodynamically tolerated VT. ^{522,939,943–945,948–950}	IIa	B
Primary prevention		
High-risk features ^c should be considered to aid individualized decision-making for ICD implantation in patients with ARVC. ^{538,939}	IIa	B
The updated 2019 ARVC risk calculator should be considered to aid individualized decision-making for ICD implantation in patients with ARVC. ^{d,524,526,536–539}	IIa	B

Cardiomiopatia aritmogena del ventricolo destro e sinistro: necessità di pacing

- L'expert consensus HRS 2019 non cita bradicardie associate alla ARVC/ALVC
- Secondo un recente articolo, oltre il 10% dei pazienti con ARVC/ALVC va incontro a blocco AV e il 3,5% a SSS
- Altri autori affermano la sicurezza dell'impianto di S-ICD in questi pazienti, e non hanno osservato necessità di impianto di pacemaker ad un follow-up mediano di 1 anno

The
American Journal
of Cardiology

2019

Bradyarrhythmias in Arrhythmogenic Right Ventricular Cardiomyopathy

Erpeng Liang, MD ¹ • Lingmin Wu, MD, PhD ¹ • Siyang Fan, MD ¹ • ... Gang Chen, MD •
Ligang Ding, MD, PhD • Yan Yao, MD, PhD   • Show all authors • Show footnotes



Subcutaneous implantable cardioverter defibrillator in patients with arrhythmogenic right ventricular cardiomyopathy: Results from an Italian multicenter registry[☆]

Federico Migliore ^a, Stefano Viani ^b, Maria Grazia Bongiorno ^b, Alessandro Zorzi ^a, Massimo Stefano Silveti ^c, Pietro Francia ^d, Antonio D'Onofrio ^e, Pietro De Franceschi ^a, Simone Sala ^f, Stefano Donzelli ^g, Giuseppe Ricciardi ^h, Endry Menardi ⁱ, Massimo Giammaria ^j, Carmelo La Greca ^k, Barbara Bauce ^a, Ilaria Rigato ^a, Sabino Iliceto ^a, Emanuele Bertaglia ^a, Igor Diemberger ^{l,1}, Domenico Corrado ^{a,*1}

Cardiomiopatia aritmogena del ventricolo destro e sinistro: necessità di ATP

- L'80% delle tachicardie ventricolari sostenute in questi pazienti sono monomorfe
- La possibilità di ATP in molti casi potrebbe evitare l'erogazione del DC shock
- Una programmazione adeguata del device potrebbe evitare di trattare TV non sostenute

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Subcutaneous implantable cardioverter defibrillator in patients with arrhythmogenic right ventricular cardiomyopathy: Results from an Italian multicenter registry*

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IJC 2019

What is the role of an ICD: SCD prevention or VT management?

Catheter ablation is recommended (**ESC Class I indication**)¹ in patients with:

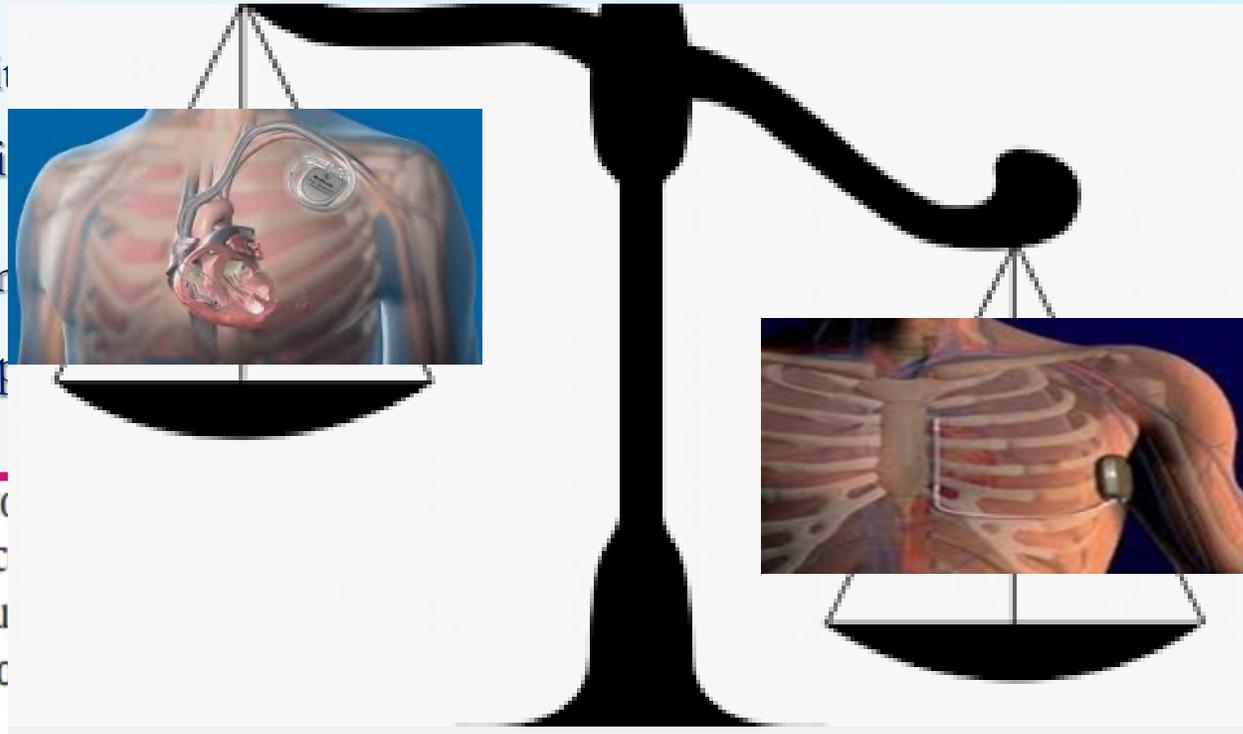
- Scar-related heart disease presenting with incessant VTs
- Ischemic heart disease and recurrent ICD shocks due to sustained VTs

Real world S-ICD data shows very rate of change out to TV-ICD due to need for ATP:

Extraction for new pacing requirements	No. of patients
<u>EFFORTLESS mid-term follow-up</u> ²	5 / 985 (0.5%)
Austrian Registry ³	1 / 236 (0.4%)

Cardiomiopatia aritmogena del ventricolo destro e sinistro: necessità di ATP

- L'età media dell'impianto di ICD in questa categoria di pazienti è di 37 anni
- La lunga aspettativa di vita, la presenza di un sistema transvenoso, di problematiche...
- L'età e la scelta del paziente influenzano la scelta del dispositivo più appropriato.



Taking all these factors into account, particularly those related to TV-ICD, particularly the high incidence of lead-related complications and the high incidence of lead-related surgical revision in patients with arrhythmogenic right ventricular cardiomyopathy are particularly prone



Subcutaneous implantable cardioverter defibrillator in patients with arrhythmogenic right ventricular cardiomyopathy: Results from an Italian multicenter registry☆

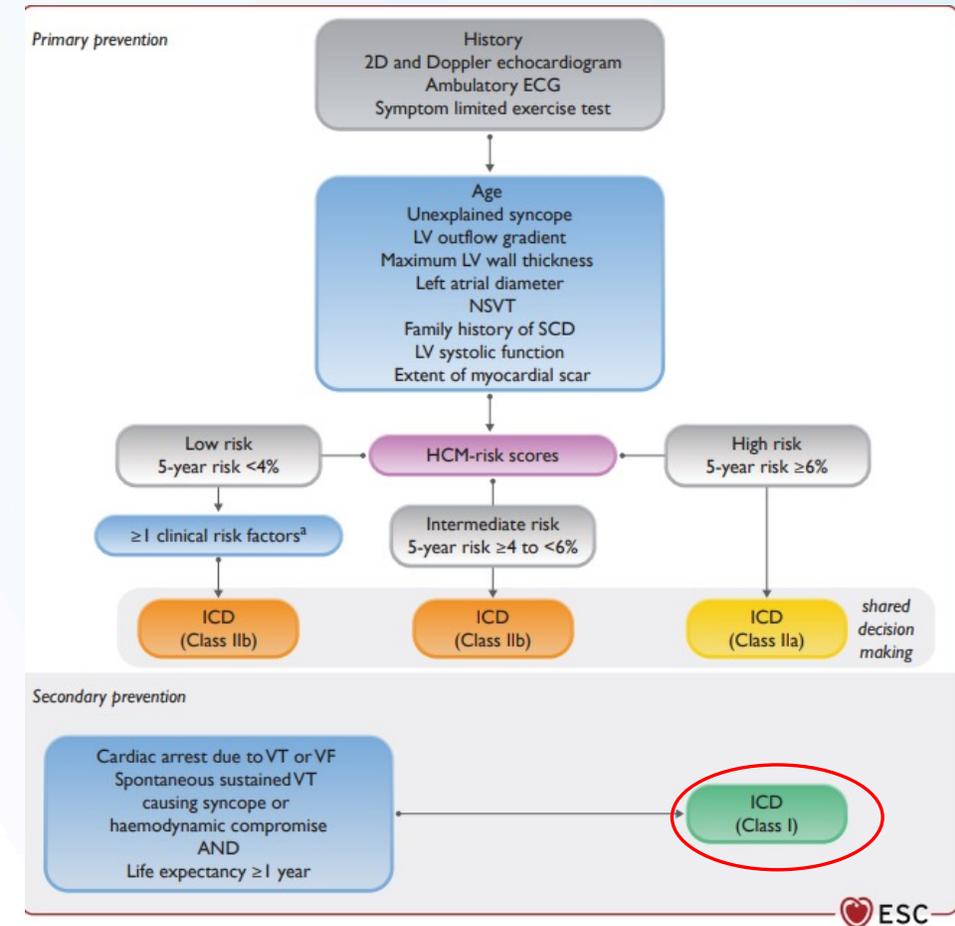
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IJC 2019

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Cardiomiopatia Ipertrofica: lineeguida ESC 2023



Recommendations on practical aspects of implantable cardioverter defibrillator therapy

Recommendations	Class ^a	Level ^b	Ref. ^c
Prior to ICD implantation, patients should be counselled on the risk of inappropriate shocks, implant complications and the social, occupational, and driving implications of the device.	I	C	219,327
β-Blockers and/or amiodarone are recommended in patients with an ICD, who have symptomatic ventricular arrhythmias or recurrent shocks despite optimal treatment and device re-programming.	I	C	219,403
Electrophysiological study is recommended in patients with ICDs and inappropriate shocks due to regular supraventricular tachycardias, to identify and treat any ablatable arrhythmia substrate.	I	C	403
A subcutaneous ICD lead system (S-ICD™) may be considered in HCM patients who do not have an indication for pacing.	IIb	C	407

HCM = hypertrophic cardiomyopathy; ICD = implantable cardioverter defibrillator; S-ICD™ = subcutaneous ICD lead system

^aClass of recommendation.

^bLevel of evidence.

^cReference(s) supporting recommendations.

2021 ESC Guidelines on cardiac pacing and CRT

Un'analisi aggregata delle coorti **EFFORTLESS** e **IDE** ha riportato che l'**S-ICD** era altrettanto sicuro ed efficace sia nei pazienti con **HCM** che in quelli non-HCM.

Lambiase PD, Gold MR, Hood M, Boersma L, Theuns DAMJ, Burke MC et al. Evaluation of subcutaneous ICD early performance in hypertrophic cardiomyopathy from the pooled EFFORTLESS and IDE cohorts. *Heart Rhythm* 2016;13:1066-74.

Inoltre, una recente analisi del database **ALTITUDE** di Boston Scientific ha dimostrato che i pazienti con **HCM** e **S-ICD** avevano un **tasso di terapie significativamente inferiore** rispetto ai **pazienti con HCM e TV-ICD**.

Jankelson L, Garber L, Sherrid M, Massera D, Jones P, Barbhaiya C et al. Subcutaneous versus transvenous implantable defibrillator in patients with hypertrophic cardiomyopathy. *Heart Rhythm* 2022;19:759-67.



ESC

European Society
of Cardiology

Europace (2023) 25, 1–9
<https://doi.org/10.1093/europace/euad270>

CLINICAL RESEARCH

Clinical course of hypertrophic cardiomyopathy patients implanted with a transvenous or subcutaneous defibrillator

Da un'analisi retrospettiva su un'ampia coorte di 427 pazienti con HCM impiantati con un S-ICD o un TV-ICD, emerge che:

... i pazienti con HCM portatori di S-ICD hanno mostrato un rischio inferiore a 5 anni di terapie ICD inappropriate e di complicanze maggiori correlate agli elettrocatteteri, con un tasso comparabile di terapie appropriate e di sopravvivenza, rispetto a quelli portatori di TV-ICD.

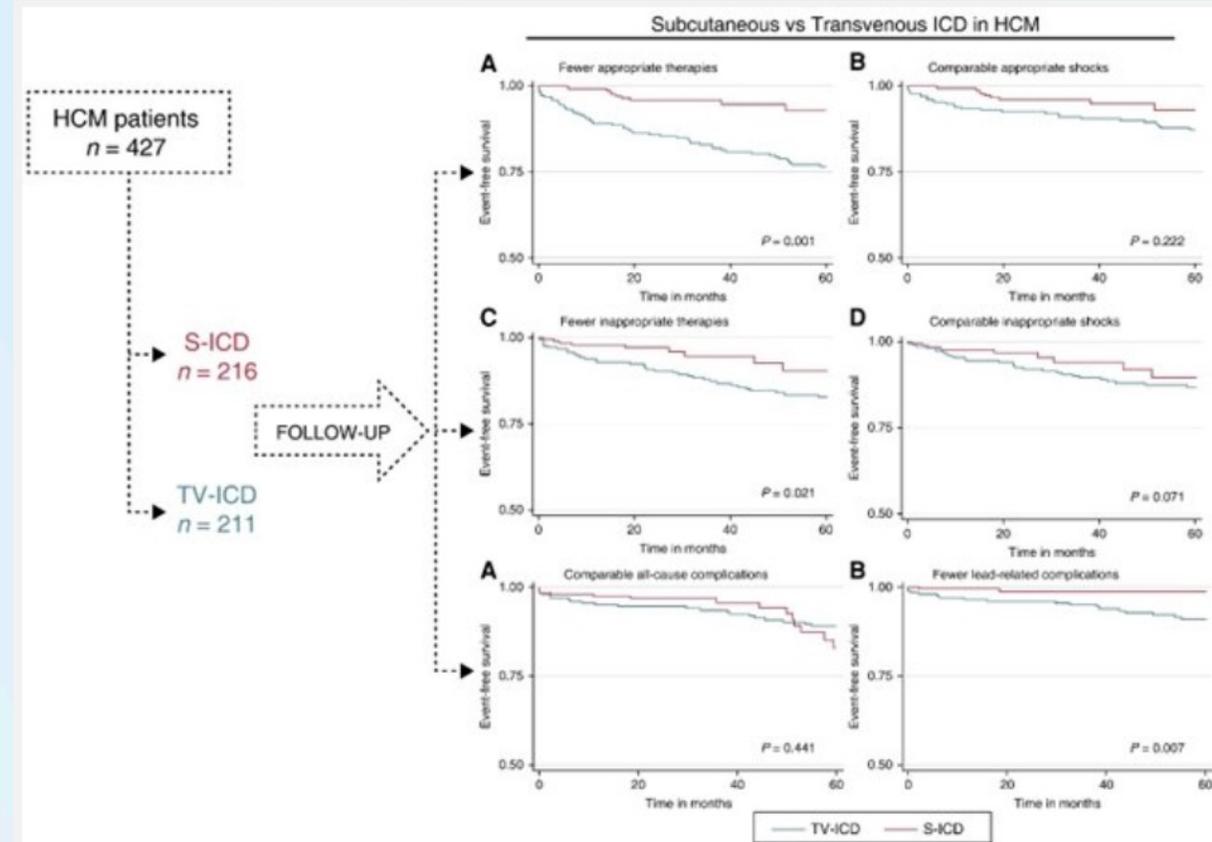


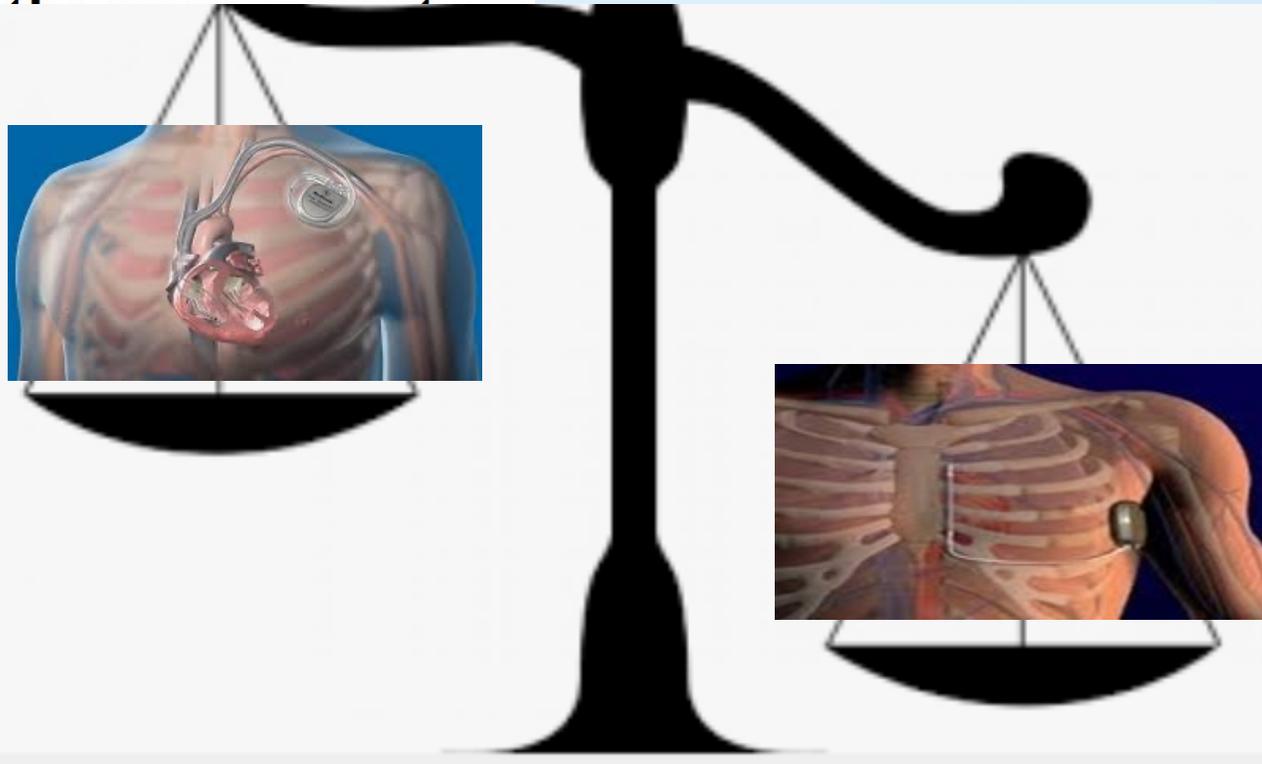
Figura 1. Principali risultati dello studio (Da: Europace, Volume 25, Issue 9, September 2023, euad270, <https://doi.org/10.1093/europace/euad270>) (3)

Cardiomiopatia ipertrofica: giovane età dei pazienti

2023 ESC Guidelines for of cardiomyopathies

Developed by the task force on the
cardiomyopathies of the European

Most contemporary series of adult incidence for cardiovascular death, thrombo-embolism being the mainly recorded fatal arrhythmic event, ventricular fibrillation (VF), but asystole, AV block described.^{752,750-754} In children with hypertrophic cardiomyopathy usually from small, highly selected cohorts, the incidence is 10% per year,⁷⁵⁵⁻⁷⁵⁷ more recent studies have shown SCD rates in the range of 1-2% per year. While much lower than previously thought, this is still 20% higher than reported in adult HCM populations. Sudden cardiac death appears to be very rare below the age of 6 years.^{81,759}

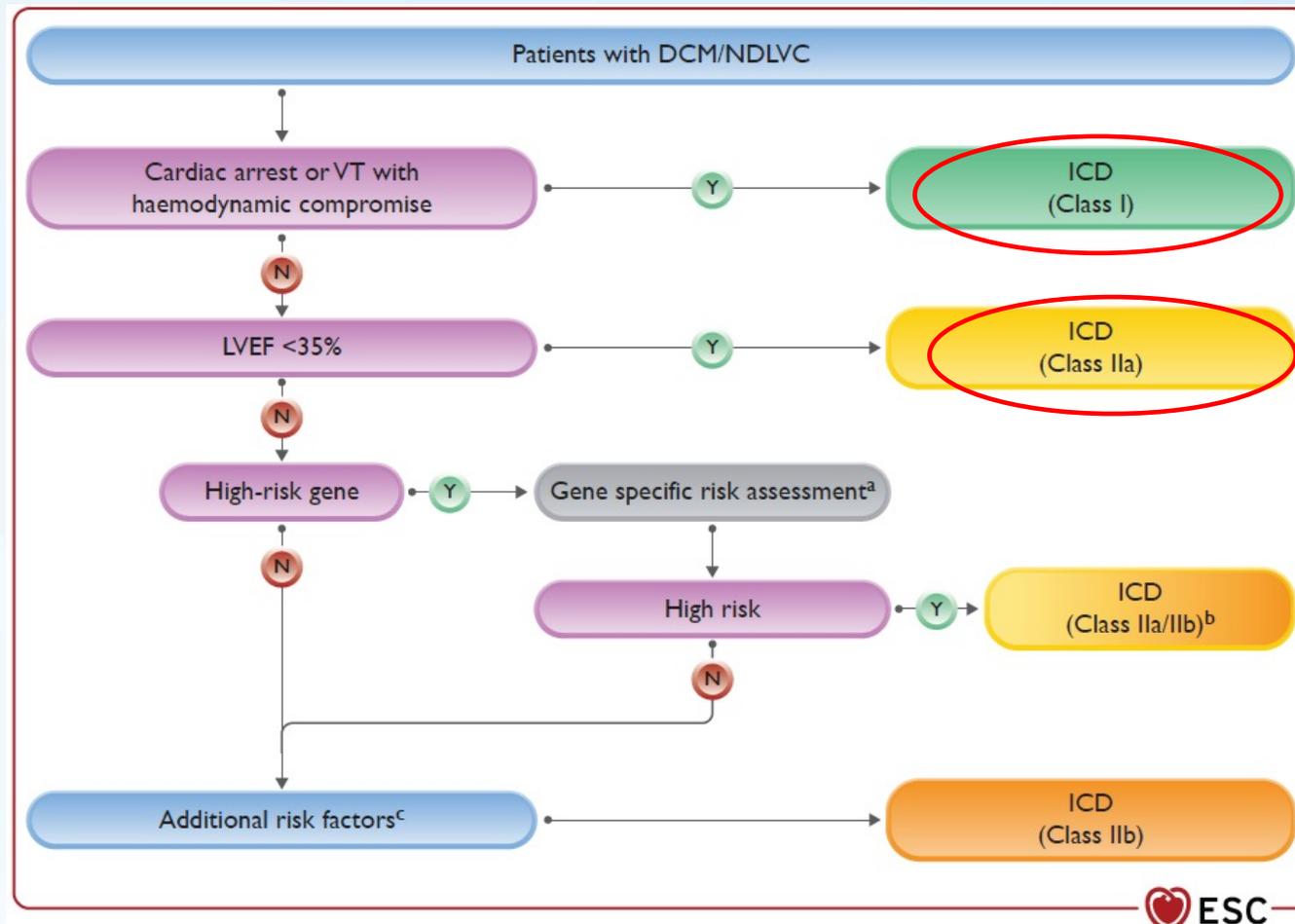


...ella popolazione
...% più elevato rispetto
...azione adulta.

...porta un'elevata probabilità
...nsvenoso, di problematiche
...tutuzioni del device/lead.

...ovrebbero essere considerati i
...scelta del dispositivo più

Cardiomiopatia dilatativa DCM e non dilatativa NDLVC: Lineeguida ESC 2023



Il ruolo del S-ICD nei pazienti con CMD



Contents lists available at ScienceDirect

Journal of Cardiology

journal homepage: www.elsevier.com/locate/jjcc

I pazienti arruolati hanno tutti indicazione all' impianto icd secondo le linee guida [2015

Dai risultati di questa analisi l' **SICD** può rappresentare un'opzione terapeutica fattibile

zione della MCI in
 n **DCM** senza
 cardiaca grave e/o
 soprattutto perché i
 DCM sono spesso
ovani e potrebbero
 ancora di più della
del rischio di
sistemiche e
vascolari.

o pazienti ha sviluppato
 di stimolazione
 o anti-bradicardica
 durante un FU di 22.9 ± 18.5 mesi.



Original article

The role of entirely subcutane
 dilated cardiomyopathy

Kevin Willy (MD), Florian Reinke (ME
 Benjamin Rath (MD), Julia Köbe (MD),
 Clinic for Cardiology II: Electrophysiology, University Hospital Mü

Journal of Cardiology-M

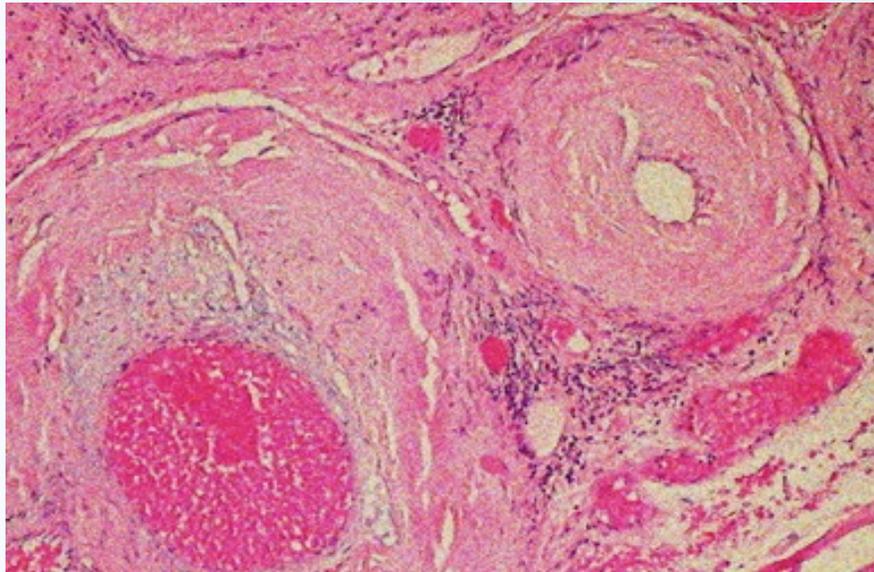
Discussion

The S-ICD™ has emerg
SCD in many underlying car
asa classic indication, as pat
reduced LVEF and BBB. T
 performance of the S-ICD™
 explicitly and could show
symptoms and normal QRS
ICD, the S-ICD™ is a re
 terminate VA occurring. In our cohort, there were o appropriate

impianto sicd post estrazione per
 CDRIE.

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Cardiomiopatie restrittive-Amiloidosi

Recommendation Table 30 — Recommendations for the management of patients with restrictive cardiomyopathy

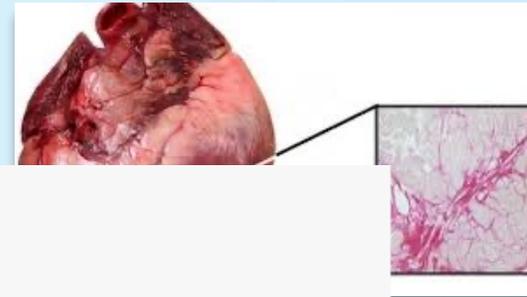
Recommendations	Class ^a	Level ^b
It is recommended that multimodality imaging be used to differentiate RCM from HCM or DCM with restrictive physiology.	I	C
It is recommended that baseline cardiac and non-cardiac investigations are performed to assess involvement of the neuromuscular system or other syndromic disorders.	I	C
Cardiac catheterization is recommended in all children with RCM to measure pulmonary artery pressures and PVR at diagnosis and at 6–12 monthly intervals to assess change in PVR. ⁹⁵³	I	B
ICD implantation is recommended to reduce the risk of sudden death and all-cause mortality in patients with RCM who have survived a cardiac arrest or have recovered from a ventricular arrhythmia causing haemodynamic instability.	I	C
Endomyocardial biopsy should be considered in patients with RCM to exclude specific diagnoses (including iron overload, storage disorders, mitochondrial cytopathies, amyloidosis, and granulomatous myocardial diseases) and to diagnose restrictive myofibrillar disease caused by desmin variants.	IIa	C
ICD implantation may be considered in children with RCM who have evidence of myocardial ischaemia and syncope. ⁹⁶⁹	IIb	C

Electrophysiologic Abnormalities in AL (Primary) Amyloidosis With Cardiac Involvement

JOHANN REISINGER, MD, SIMON W. DUBREY, MD, MICHAEL LAVALLEY, PhD,*
MARTHA SKINNER, MD,* RODNEY H. FALK, MD, FACC

Boston, Massachusetts

Cardiomiopatia infiltrativa: Amiloidosi



➤ Un'elevata percentuale di pazienti con un livello del sistema di conduzione degenerativa

- Disfunzioni del nodo
- Disfunzione della conduzione circa la metà dei pazienti
- Le aritmie più diffuse
- Le strategie di controllo spesso non sono attive a causa dell'indebolimento della ventricola sinistra
- L'ablazione del nodo è una strategia utile



In questi pazienti, le probabilità di successo con i pacemaker sono molto basse

Il prolungato intervallo HV è il più forte predittore di morte cardiaca

Per i pazienti con amiloidosi, si ritiene che l'ICD sottocutaneo sia una strategia utile

Canalopatie: S. di Brugada - S. QT lungo-S. QT corto

ESC European Heart Journal (2022) 00, 1–130
European Society of Cardiology <https://doi.org/10.1093/eurheartj/ehac262> **ESC GUIDELINES**

2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

Risk stratification, prevention of SCD and treatment of VA		
ICD implantation is recommended in patients with BrS who: (a) Are survivors of an aborted CA and/or (b) Have documented spontaneous sustained VT. ^{980,990-992}	I	C
ICD implantation should be considered in patients with type 1 Brugada pattern and an arrhythmic syncope. ^{990,992,996}	IIa	C
Implantation of a loop recorder should be considered in BrS patients with an unexplained syncope. ^{997,999}	IIa	C
Quinidine should be considered in patients with BrS who qualify for an ICD but have a contraindication, decline, or have recurrent ICD shocks. ^{922,1006,1007}	IIa	C
Isoproterenol infusion should be considered in BrS patients suffering electrical storm. ¹⁰⁰⁸	IIa	C
Catheter ablation of triggering PVCs and/or RVOT epicardial substrate should be considered in BrS patients with recurrent appropriate ICD shocks refractory to drug therapy. ¹⁰¹⁰⁻¹⁰¹⁵	IIa	C
PES may be considered in asymptomatic patients with a spontaneous type I BrS ECG. ¹⁵⁵	IIb	B
ICD implantation may be considered in selected asymptomatic BrS patients with inducible VF during PES using up to 2 extra stimuli. ¹⁵⁵	IIb	C
Catheter ablation in asymptomatic BrS patients is not recommended.	III	C

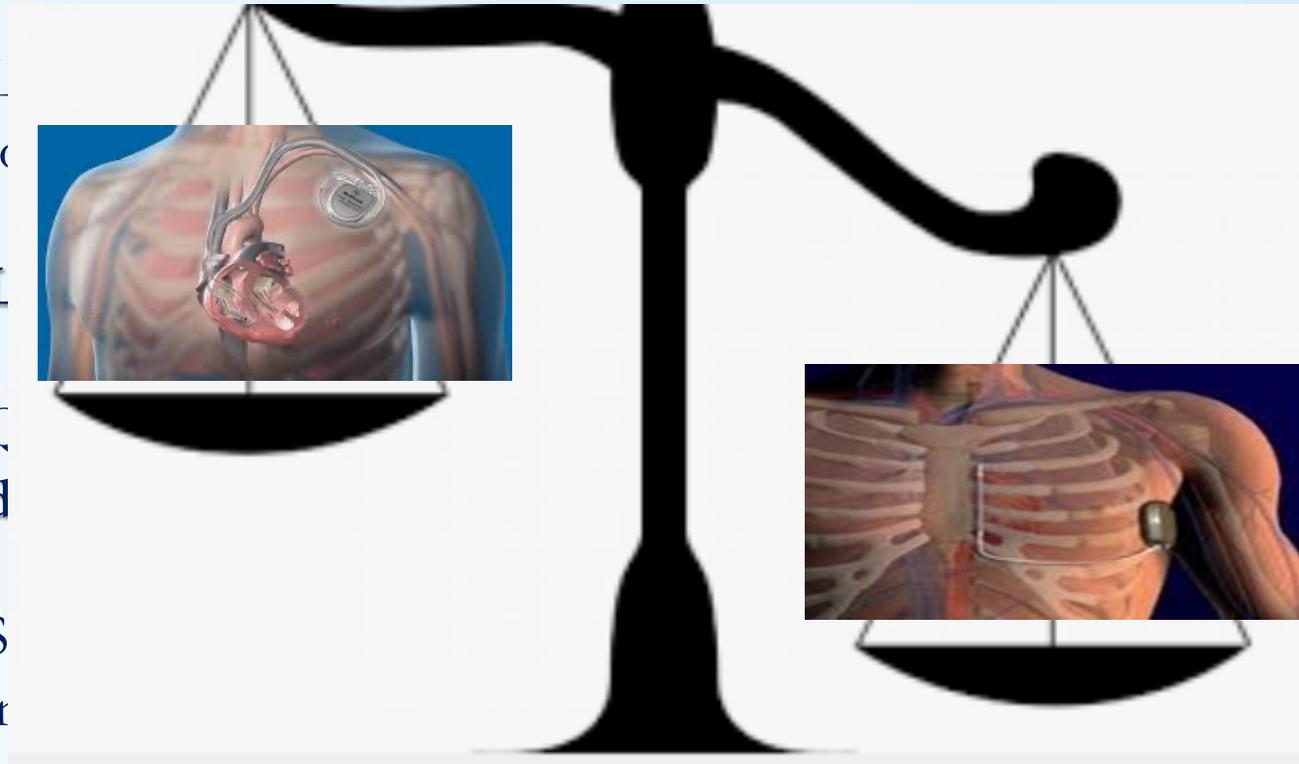
Risk stratification, prevention of SCD and treatment of VA		
ICD implantation in addition to beta-blockers is recommended in LQTS patients with CA. ^{952,953,962,963}	I	B
ICD implantation is recommended in patients with LQTS who are symptomatic ^d while receiving beta-blockers and genotype-specific therapies.	I	C

Risk stratification, SCD prevention and treatment of VA		
ICD implantation is recommended in patients with a diagnosis of SQTS who: (a) are survivors of an aborted CA and/or (b) have documented spontaneous sustained VT. ¹⁰⁶³	I	C

Canalopatie: S. di Brugada- S. QT lungo-S. QT corto



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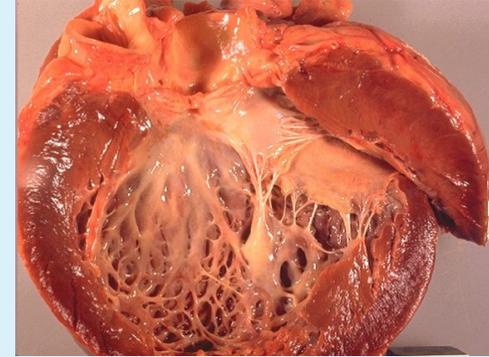


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Per la scelta del S-ICD ai fini della prevenzione della MI nei pz affetti da Cardiomiopatie



A tailored approach...

In base alle linee guida e alla letteratura clinica^{19,33,39}

• **Stimolazione antibradicardica**
(~6 % pazienti)^{35,37}

• **Indicazione di CRT-D**

• **Necessità di ATP all'impianto**
(~7 % pazienti)^{25,35,40}

• **Necessità di ATP in futuro**
(~1,8 % pazienti/anno)^{35,40,41}

• **Screening negativo S-ICD**
(~4-10 % pazienti)^{5,38,39}

• **Pazienti ICD "tipici"**
FE bassa/CHF ossia MADIT II, SCD-HeFT

• **Pazienti ad alto rischio**
Rischio di complicanze legate all'elettrocattetero, alto rischio di infezioni, problemi con l'accesso venoso (Classe I AHA/ACC/HRS)¹⁹

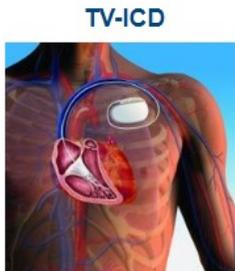
• **Pazienti ICD più anziani**
≥70 anni

• **Pazienti senza indicazione di stimolazione**
(Classe IIa)^{8,9}

MODULAR CRM SYSTEMS: designed to deliver pacing and ATP in coordination



Modular CRM
Leadless pacemaker
designed to deliver



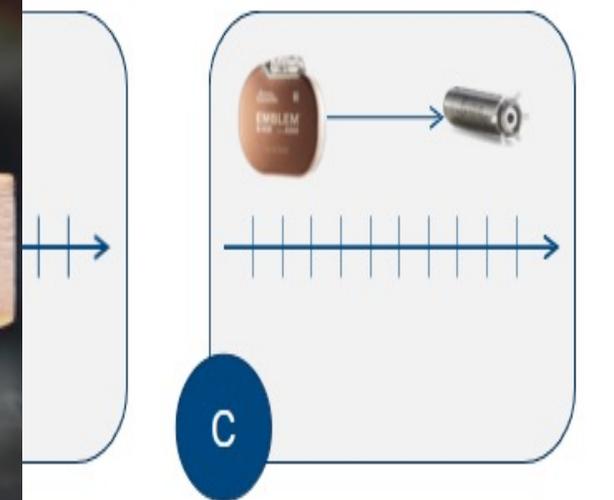
TV-ICD



mCRM™ System*
EMBLEM™ S-ICD*
EMPOWER™ Modular Pacing Sys

Documented need
for Pacing or ATP

Potential need
for Pacing or ATP



- S-ICD implanted first
- LP implanted later

Potential application for patient with ICD indication at implant, who later develops a need for pacing.