Indicazioni all'impianto di PM ed ICD

Dr.ssa Marina Moretti

UOS Elettrofisiologia ed Elettrostimolazione
UOC Cardiologia
ASST Bergamo Est
Ospedale "Bolognini" di Seriate

Sistema Socio Sanitario
Regione Lombardia
ASST Bergamo Est

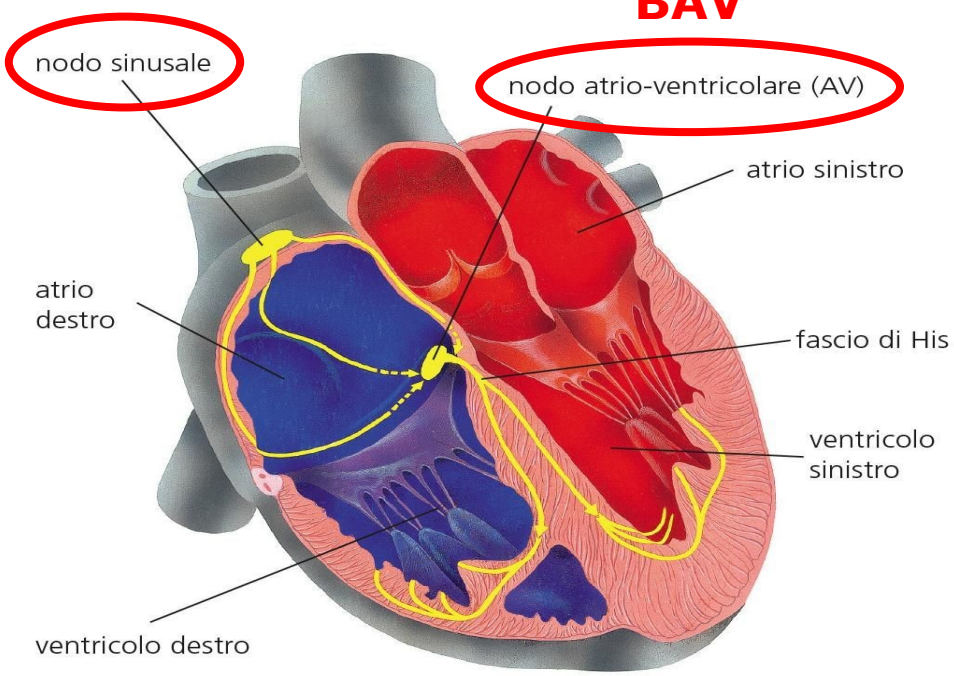
Indicazioni all'impianto di PM

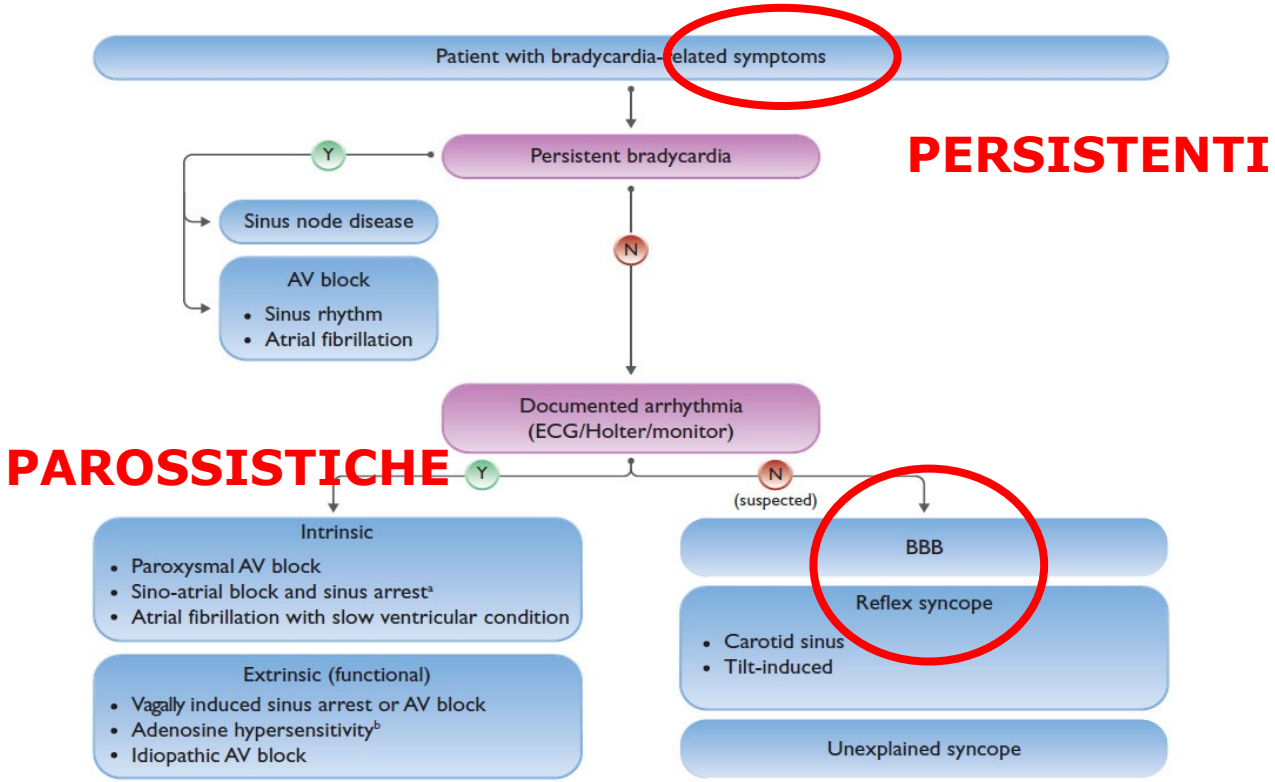
Sistema Socio Sanitario
Regione Lombardia
ASST Bergamo Est

Sistema di conduzione cardiaco e bradiaritmie

MNS

BAV





PERSISTENTI

PAROSSISTICHE

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Disfunzione del nodo del seno

MNS+

SINTOMI

S. BRADI-TACHI

Recommendations for pacing in sinus node dysfunction

Recommendations	Class[a]	Level[b]
In patients with SND and a DDD pacemaker, minimization of unnecessary ventricular pacing through programming is recommended.[144,151,159,164,166–169]	I	A
Pacing is indicated in SND when symptoms can clearly be attributed to bradyarrhythmias.[14,128–131]	I	B
Pacing is indicated in symptomatic patients with the bradycardia–tachycardia form of SND in order to correct bradyarrhythmias and enable pharmacological treatment, unless ablation of the tachyarrhythmia is preferred.[17,20,21,136–138,170,171]	I	B
In patients who present chronotropic incompetence and have clear symptoms during exercise, DDD with rate-responsive pacing should be considered.[172,173]	IIa	B

INCOMPETENZA CRONOTROPA

ABLAZIONE FA

AF ablation should be considered as a strategy to avoid pacemaker implantation in patients with AF-related bradycardia or symptomatic pre-automaticity pauses, after AF conversion, taking into account the clinical situation.[136–139,174]	IIa	C
In patients with the bradycardia–tachycardia variant of SND, programming of atrial ATP may be considered.[164,165]	IIb	B
In patients with syncope, cardiac pacing may be considered to reduce recurrent syncope when asymptomatic pause(s) >6 s due to sinus arrest is documented.[133,134]	IIb	C
Pacing may be considered in SND when symptoms are likely to be due to bradyarrhythmias, when the evidence is not conclusive.	IIb	C
Pacing is not recommended in patients with bradyarrhythmias related to SND that are asymptomatic or due to transient causes that can be corrected and prevented.[33]	III	C

ATP = antitachycardia pacing; DDD = dual-chamber, atrioventricular pacing; SND = sinus node dysfunction.
[a]Class of recommendation.
[b]Level of evidence.

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Blocco atrio-ventricolare

BAV SENZA SINTOMI

BAV LW+ SINTOMI

BAV I GRADO + SINTOMI

Recommendations for pacing for atrioventricular block

Recommendations	Class[a]	Level[b]
Pacing is indicated in patients in SR with permanent or paroxysmal third- or second-degree type 2, infranodal 2:1, or high-degree AVB, irrespective of symptoms.[c 9–12]	I	C
Pacing is indicated in patients with atrial arrhythmia (mainly AF) and permanent or paroxysmal third- or high-degree AVB irrespective of symptoms.	I	C
In patients with permanent AF in need of a pacemaker, ventricular pacing with rate response function is recommended.[201–204]	I	C
Pacing should be considered in patients with second-degree type 1 AVB that causes symptoms or is found to be located at intra- or infra-His levels at EPS.[177–180]	IIa	C
In patients with AVB, DDD should be preferred over single-chamber ventricular pacing to avoid pacemaker syndrome and to improve quality of life.[20,140,181,182]	IIa	A
Permanent pacemaker implantation should be considered for patients with persistent symptoms similar to those of pacemaker syndrome and clearly attributable to first-degree AVB (PR >0.3 s).[205–207]	IIa	C
Pacing is not recommended in patients with AVB due to transient causes that can be corrected and prevented.	III	C

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Disturbi di conduzione senza BAV

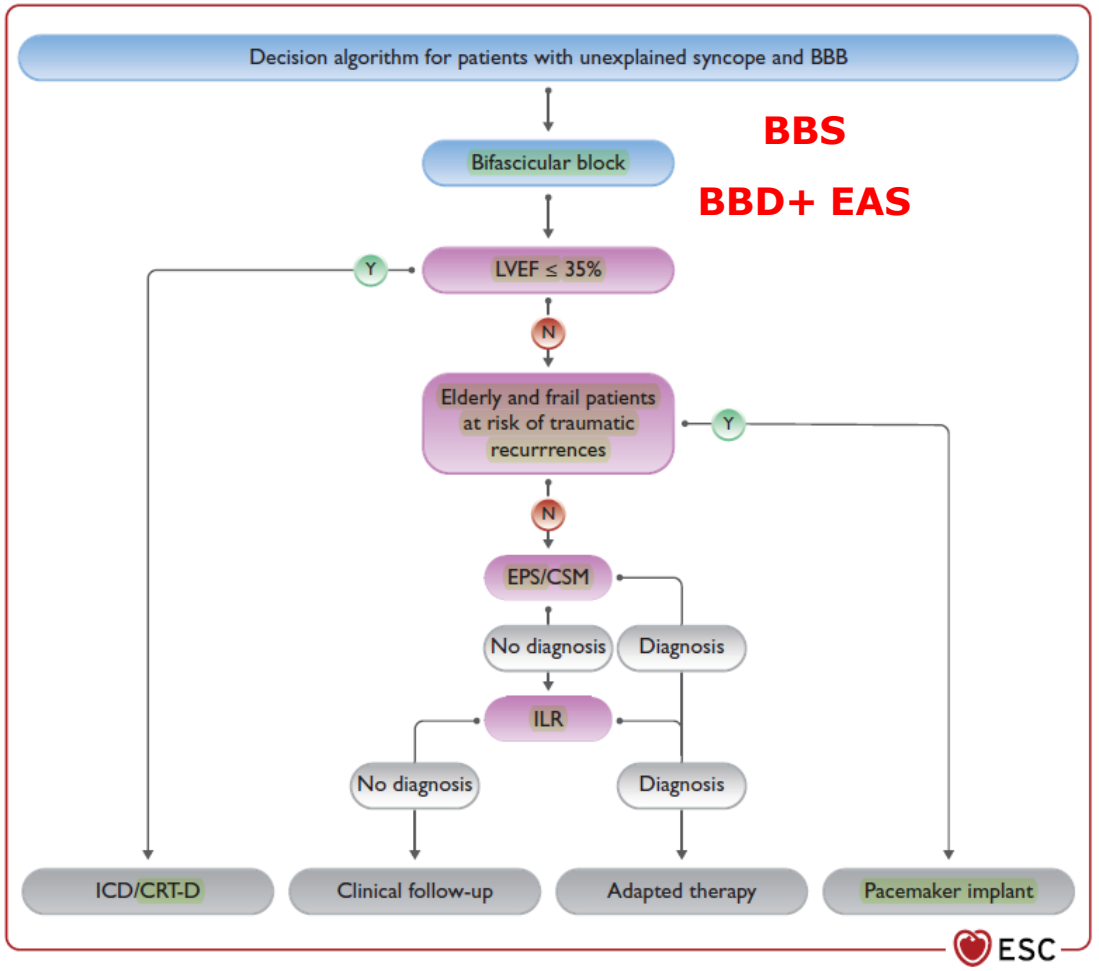


Figure 6 Decision algorithm for patients with unexplained syncope and bundle branch block. BBB = bundle branch block; CRT-D = defibrillator with cardiac resynchronization therapy; CSM = carotid sinus massage; EPS = electrophysiology study; ICD = implantable cardioverter-defibrillator; ILR = implantable loop recorder; LVEF = left ventricular ejection fraction.

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Blocco di branca

Recommendations for pacing in patients with bundle branch block

Recommendations	Class[a]	Level[b]
In patients with unexplained syncope and bifascicular block, a pacemaker is indicated in the presence of either a baseline HV of ≥70 ms, second- or third-degree intra- or infra-Hisian block during incremental atrial pacing, or an abnormal response to pharmacological challenge.[119,120]	I	B
Pacing is indicated in patients with alternating BBB with or without symptoms.	I	C
Pacing may be considered in selected patients with unexplained syncope and bifascicular block without EPS (elderly, frail patients, high-risk and/or recurrent syncope).[213]	IIb	B
Pacing is not recommended for asymptomatic BBB or bifascicular block.[115,121,215]	III	B

BBB = bundle branch block; EPS = electrophysiology study; HV = His–ventricular interval.
[a]Class of recommendation.
[b]Level of evidence.

SEF

PM

BBD/// BBS SENZA SINTOMI

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

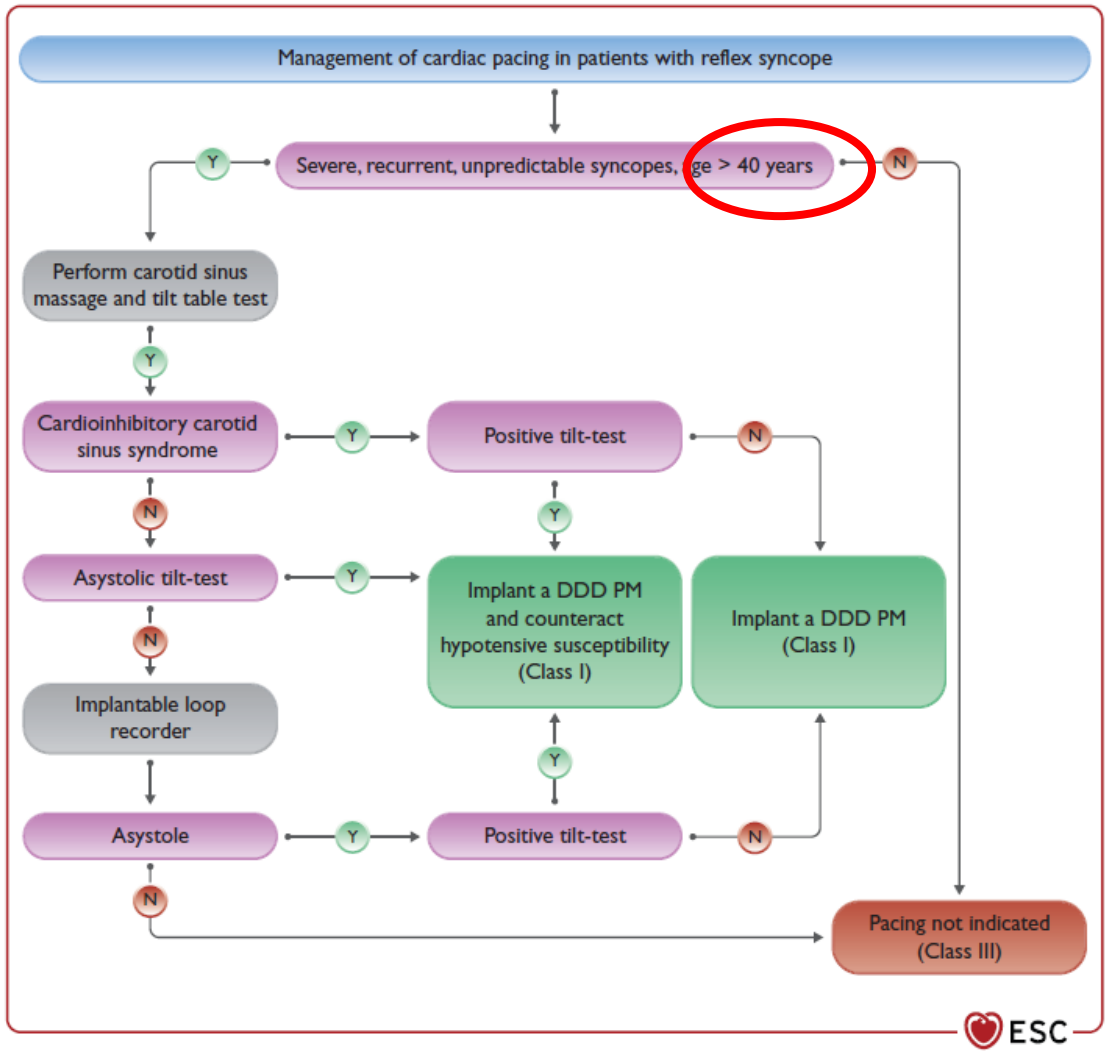
Sincope riflessa cardioinibitoria

COMPONENTE CARDIOINIBITORI A PREDOMINANTE

CORRELAZIONE SINTOMI-ASISTOLIA

ASISTOLIA>3 s+ SINCOPE

Sindrome seno carotideo VS ipersensibilità



Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Sincope riflessa

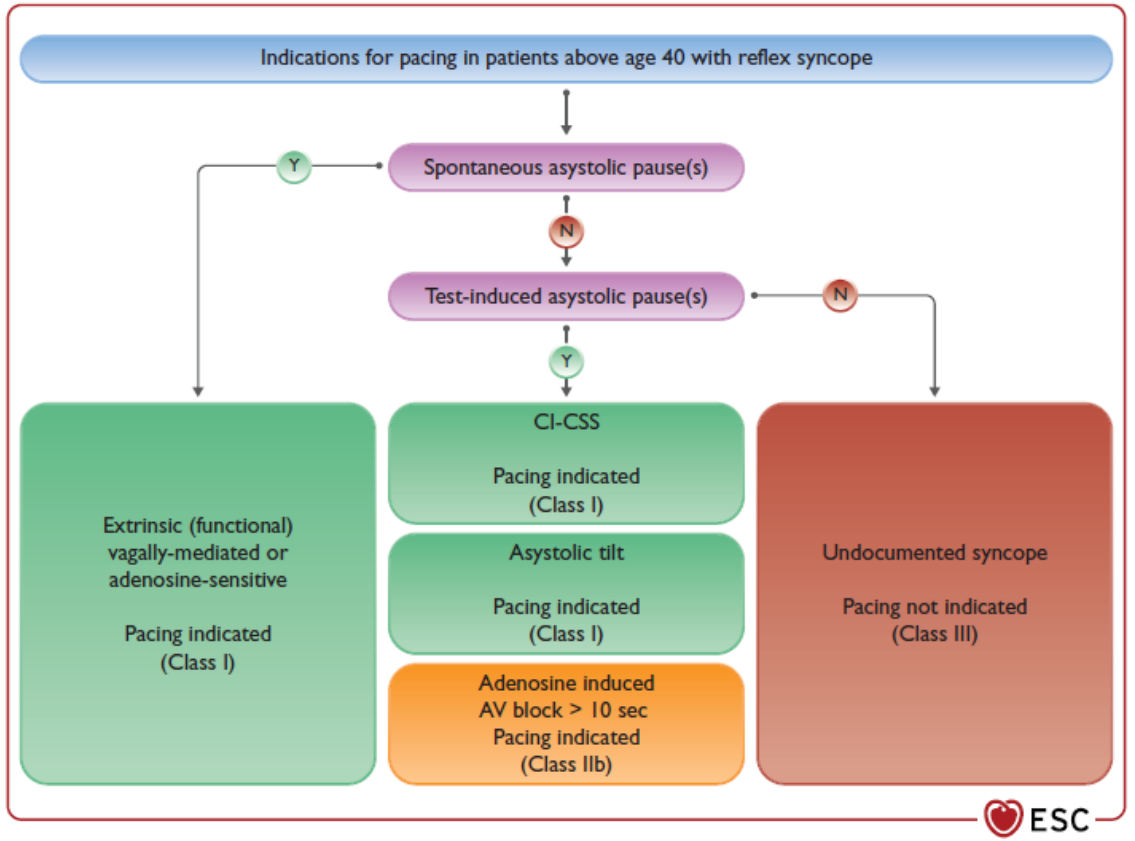


Figure 8 Summary of indications for pacing in patients >40 years of age with reflex syncope. CI-CSS = cardioinhibitory carotid sinus syndrome. Note: spontaneous asystolic pause = 3 s symptomatic or 6 s asymptomatic. Adapted from Brignole *et al.*[62]

Recommendations for pacing for reflex syncope

Recommendations	Class[a]	Level[b]
Dual-chamber cardiac pacing is indicated to reduce recurrent syncope in patients aged >40 years, with severe, unpredictable, recurrent syncope who have: • spontaneous documented symptomatic asystolic pause(s) >3 s or asymptomatic pause(s) >6 s due to sinus arrest or AVB; or • cardioinhibitory carotid sinus syndrome; or • asystolic syncope during tilt testing.[62,219,220,226,228,229]	I	A
Dual-chamber cardiac pacing may be considered to reduce syncope recurrences in patients with the clinical features of adenosine-sensitive syncope.[230]	IIb	B
Cardiac pacing is not indicated in the absence of a documented cardioinhibitory reflex.[231,232]	III	B

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

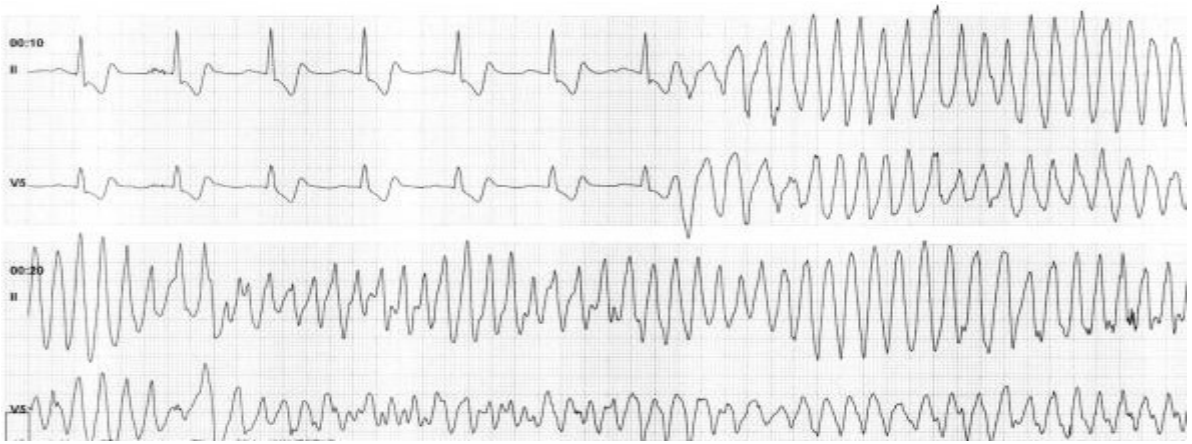
Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Indicazioni all'impianto di ICD

Sistema Socio Sanitario
Regione Lombardia
ASST Bergamo Est

Indicazioni all'impianto di ICD

1. **PREVENZIONE PRIMARIA:** pazienti ad **elevato rischio di arresto cardiaco** o **tachiaritmie ventricolari emodinamicamente instabili**
    - **HFrEF**
    - **Cardiomiopatie** (ipertrofica, displasia aritmogena…)
    - **Canalopatie** (S. di Brugada, S. del QT lungo…)
2. **PREVENZIONE SECONDARIA**: **sopravvissuti** ad **arresto cardiaco** o a **tachicardia ventricolare emodinamicamente instabile**



Indicazioni all'impianto di ICD

PREVENZIONE SECONDARIA

Recommendations for an implantable cardioverter-defibrillator in patients with heart failure

Recommendations	Class[a]	Level[b]
Secondary prevention		
An ICD is recommended to reduce the risk of sudden death and all-cause mortality in patients who have recovered from a ventricular arrhythmia causing haemodynamic instability, and who are expected to survive for >1 year with good functional status, in the absence of reversible causes or unless the ventricular arrhythmia has occurred <48 h after a MI.[162–164]	I	A
Primary prevention		
An ICD is recommended to reduce the risk of sudden death and all-cause mortality in patients with symptomatic HF (NYHA class II–III) of an ischaemic aetiology (unless they have had a MI in the prior 40 days—see below), and an LVEF ≤35% despite ≥3 months of OMT, provided they are expected to survive substantially longer than 1 year with good functional status.[161,165]	I	A
An ICD should be considered to reduce the risk of sudden death and all-cause mortality in patients with symptomatic HF (NYHA class II–III) of a non-ischaemic aetiology, and an LVEF ≤35% despite ≥3 months of OMT, provided they are expected to survive substantially longer than 1 year with good functional status.[161,166,167]	IIa	A

PREVENZIONE PRIMARIA

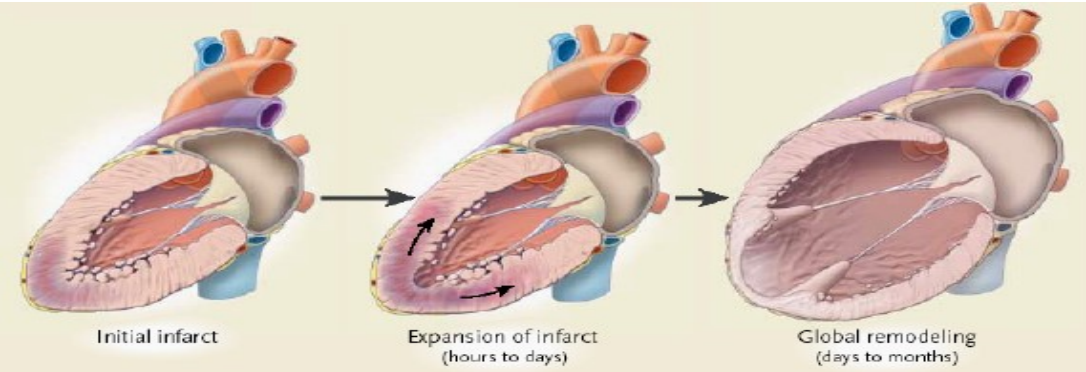
ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Indicazioni all'impianto di CRT

Sistema Socio Sanitario
Regione Lombardia
ASST Bergamo Est

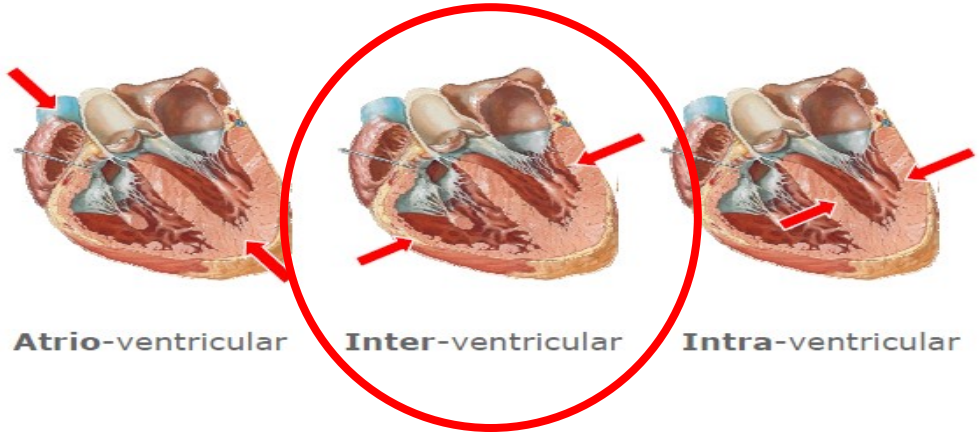
Terapia di resincronizzazione



Scompenso cardiaco → **dilatazione** e **rimodellamento** delle camere cardiache

DISSINCRONIE, ovvero ritardi nella conduzione:

- Atrio-Ventricolari
- **Inter-Ventricolari**
- Intra-Ventricolari

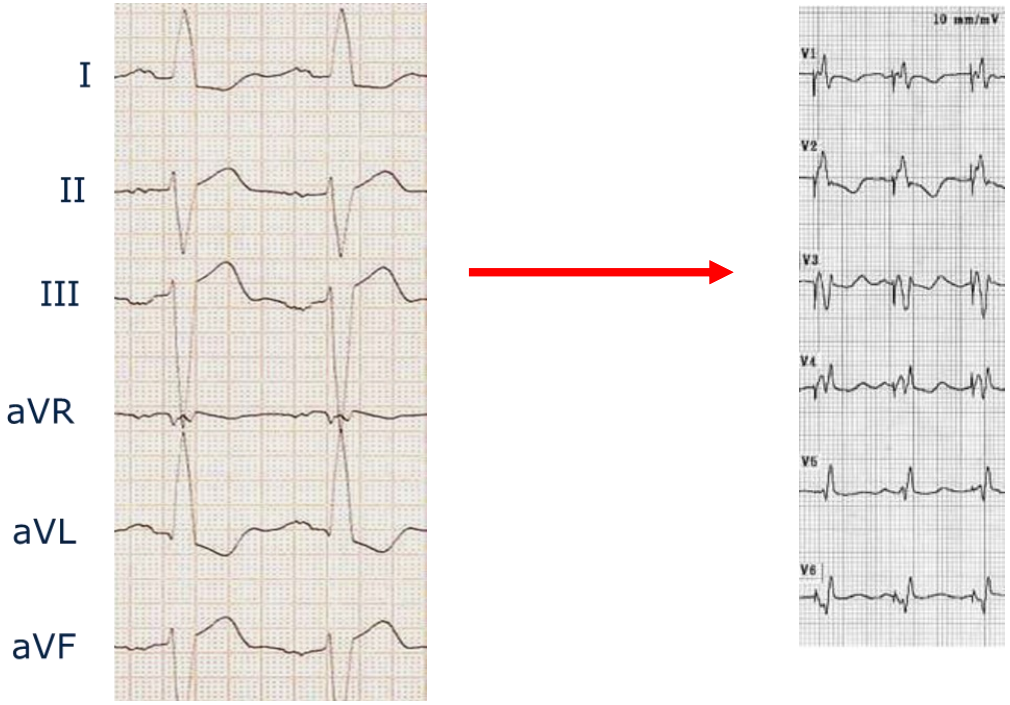


Obiettivo della **CRT** = **correzione dissincronia** fra **ventricolo destro** e **sinistro**

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Dissincronia elettrica e CRT



↓durata QRS → rimodellamento inverso→ ↓mortalità e morbilità + miglioramento sintomatologico

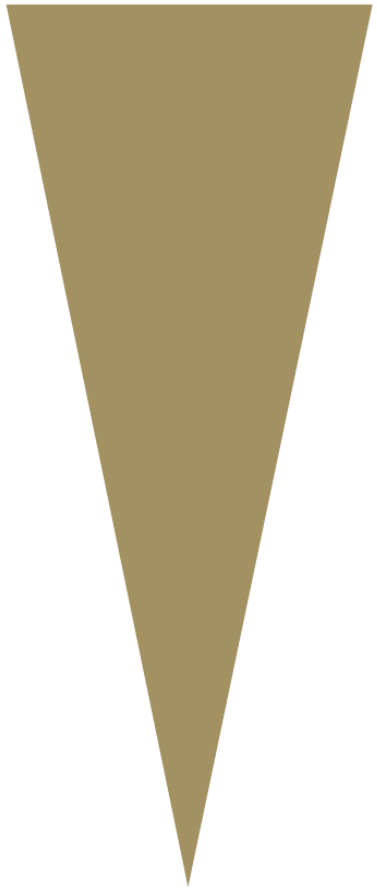
ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Predittori di risposta alla CRT

Elevata risposta (responders)



QRS largo, BBSx, femmine, cardiopatia non ischemica

Maschi, cardiopatia ischemica

Bassa risposta (non-responders)

QRS più stretto, blocco di branca con morfologia non-BBSx

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. 42, 3427–3520 (2021).

Terapia di resincronizzazione

Recommendations for cardiac resynchronization therapy in patients in sinus rhythm

Recommendations	Class[a]	Level[b]
LBBB QRS morphology		
CRT is recommended for symptomatic patients with HF in SR with LVEF ≤35%, QRS duration ≥150 ms, and LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity and mortality.[37,39,40,254–266,283,284]	I	A
CRT should be considered for symptomatic patients with HF in SR with LVEF ≤35%, QRS duration 130–149 ms, and LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity and mortality.[37,39,40,254–266,283,284]	IIa	B
Non-LBBB QRS morphology		
CRT should be considered for symptomatic patients with HF in SR with LVEF ≤35%, QRS duration ≥150 ms, and non-LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity.[37,39,40,254–266,283,284]	IIa	B
CRT may be considered for symptomatic patients with HF in SR with LVEF ≤35%, QRS duration 130–149 ms, and non-LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity.[273–278,281]	IIb	B
QRS duration		
CRT is not indicated in patients with HF and QRS duration <130 ms without an indication for RV pacing.[264,282]	III	A

© ESC 2021

1. **HF sintomatico** (NYHA ≥2)
2. **LVEF ≤35%**
3. **QRS ≥130 msec**

Recommendations for cardiac resynchronization therapy in patients with persistent or permanent atrial fibrillation

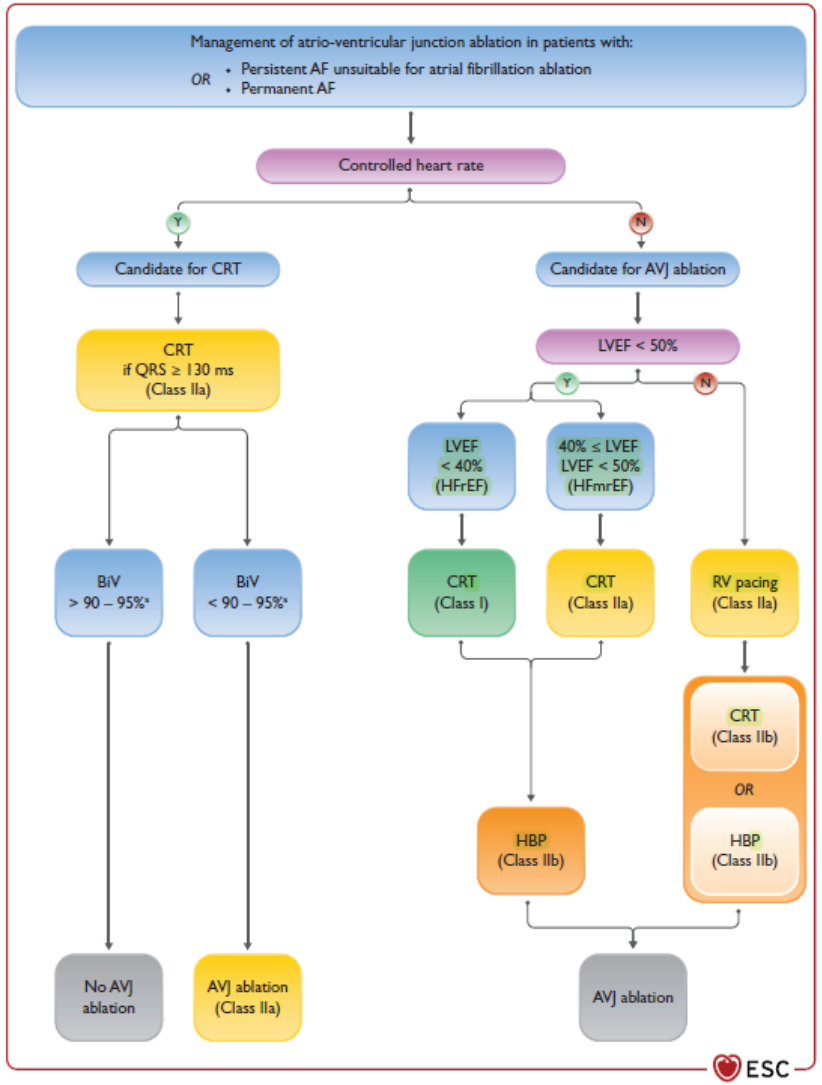
Recommendations	Class[a]	Level[b]
1) In patients with HF with permanent AF who are candidates for CRT:		
1A) CRT should be considered for patients with HF and LVEF ≤35% in NYHA class III or IV despite OMT if they are in AF and have intrinsic QRS ≥130 ms, provided a strategy to ensure biventricular capture is in place, in order to improve symptoms and reduce morbidity and mortality.[302,306,307,322]	IIa	C
1B) AVJ ablation should be added in the case of incomplete biventricular pacing (<90–95%) due to conducted AF.[297–302]	IIa	B

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Terapia di resincronizzazione



- **Ablate and pace:** in **ablazione del nodo AV CRT** anche se **LVEF lievemente ridotta (≤50%)** o **normale**

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Terapia di resincronizzazione

Recommendation for patients with heart failure and atrioventricular block

Recommendation	Class[a]	Level[b]
CRT rather than RV pacing is recommended for patients with HFrEF (<40%) regardless of NYHA class who have an indication for ventricular pacing and high-degree AVB in order to reduce morbidity. This includes patients with AF.[183,190,196,268,313,323,357–359,361,362]	I	A

© ESC 2021

Elevata % pacing+ FE<40%
anche se **asintomatici**

Recommendation for upgrade from right ventricular pacing to cardiac resynchronization therapy

Recommendation	Class[a]	Level[b]
Patients who have received a conventional pacemaker or an ICD and who subsequently develop symptomatic HF with LVEF ≤35% despite OMT, and who have a significant[c] proportion of RV pacing, should be considered for upgrade to CRT.[37,148,185,190,324–352]	IIa	B

© ESC 2021

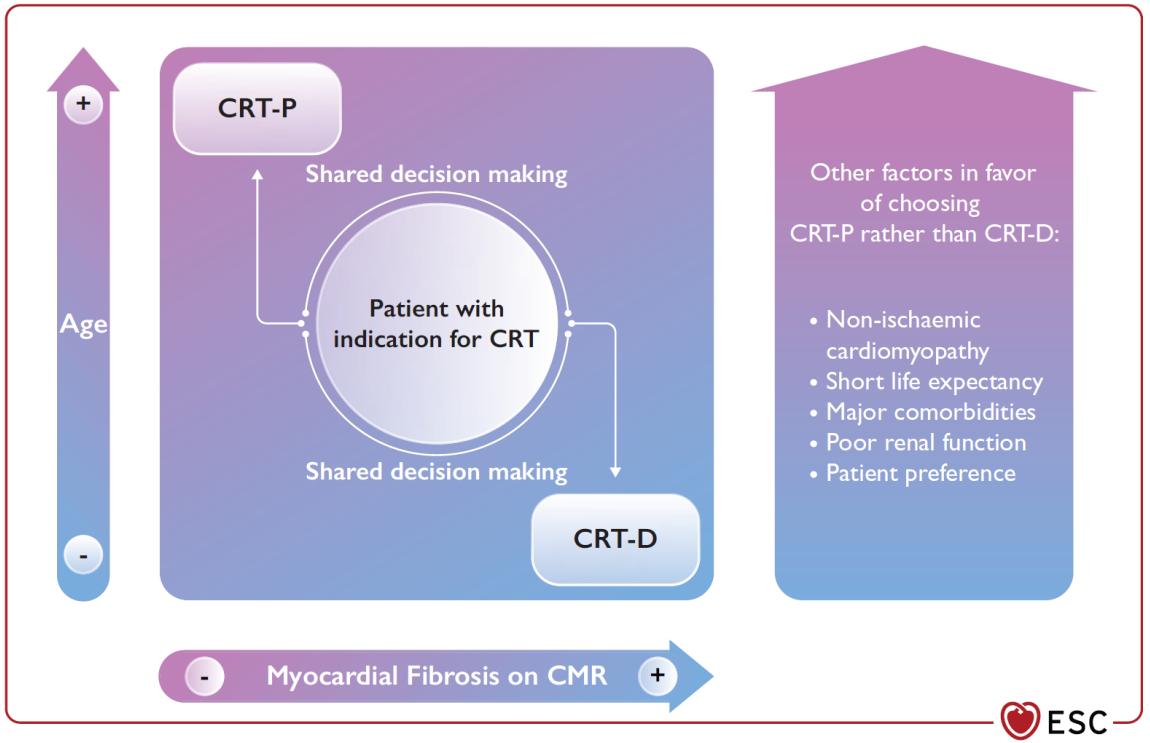
Upgrading a CRT

ORDINE DEI MEDICI CHIRURGHI E DEGLI ODONTOIATRI DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario Regione Lombardia ASST Bergamo Est

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. **42**, 3427–3520 (2021).

Terapia di resincronizzazione



Factors favouring CRT-P	Factors favouring CRT-D
Advanced heart failure	Life expectancy >1 year
Severe renal insufficiency or dialysis	Stable heart failure, NYHA II
Other major co-morbidities	Ischaemic heart disease (low and intermediate MADIT risk score)
Frailty	Lack of comorbidities
Cachexia	

Migliorare la qualità di vita

Glikson, M. et al. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur. Heart J. 42, 3427–3520 (2021).
Brignole M, et al. 2013 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy. Eur Heart J. 2013;**34**(29):2281-2329.

GRAZIE

ORDINE DEI MEDICI CHIRURGHI
E DEGLI ODONTOIATRI
DELLA PROVINCIA DI BERGAMO

Sistema Socio Sanitario
Regione Lombardia
ASST Bergamo Est