

**13ÈME
CARDIO
RUN**

2021

CONGRÈS DE PATHOLOGIE CARDIO-VASCULAIRE

29-30 SEPTEMBRE & 1 OCTOBRE 2021

HÔTEL SAINT ALEXIS - ÎLE DE LA RÉUNION, FRANCE



*Quoi de neuf en resynchronisation?
Retour sur l'ESC 2021*

Septembre 2021

*Pascal Defaye
CHU Grenoble-Alpes*



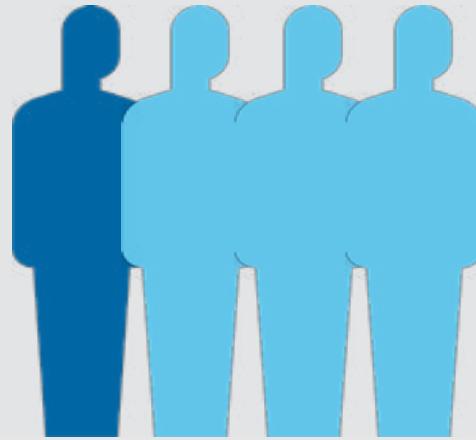
UGA
Université
Grenoble Alpes



Pourquoi traiter l'insuffisance cardiaque?

Un enjeu de santé publique

+1 MILLION
de personnes
souffrent d'IC en
France (soit 2,3% de la
population)^{1,2}



**PRINCIPALE CAUSE
D'HOSPITALISATION**

Après 65 ans²

UNE PATHOLOGIE LOURDE :

30-60%

De survie dans les
2 à 5 ans qui
suivent le
diagnostic³⁻⁴

+70 000

Décès sont associés
à une insuffisance
cardiaque chaque
année¹

42%

Risque de ré-
hospitalisation à 1 an
après une première
hospitalisation pour IC⁵

2/3

Du coût de la prise en
charge de l'IC sont liés
aux hospitalisations
(récurrentes et
prolongées)^{2,6}

1 INVS. Page consultée <http://invs.santepubliquefrance.fr/Dossiers-thematiques/Maladies-chroniques-et-traumatismes/Maladies-cardio-neuro-vasculaires/L-insuffisance-cardiaque>

2 Galinier M et al. Parcours de soins. Dossier insuffisance cardiaque. Etat des lieux en France en 2013. Le Concours médical 2013 ; 135 (6) : 443-447

3 Dossier CnamTS Insuffisance cardiaque : caractéristique, traitements et devenir à deux ans après une première hospitalisation en 2009 – Rapport du 30/11/2013

4 Société Française de Cardiologie. Page consultée <https://sfcardio.fr/publication/education-therapeutique-du-patient-atteint-dinsuffisance-cardiaque-chronique>

5 De Peretti C (DRESS). Mortalité après hospitalisation pour motif cardio-vasculaire Description et comparaison avec les causes de décès. Les dossiers de la DREES. Mars 2017. N°12

6 Merlière J. Caractéristiques et trajet de soins des insuffisants cardiaques du Régime général. Point de repère. Août 2012, numéro 38

Bénéfices de la CRT

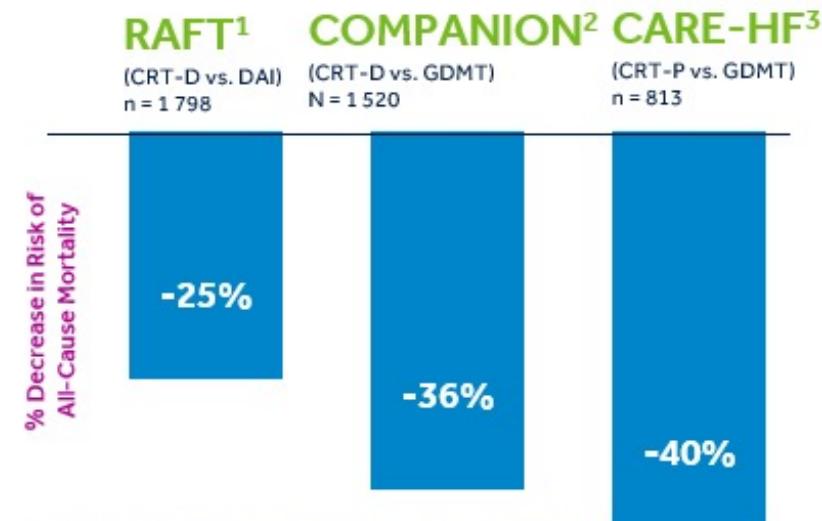
> 7 000 PATIENTS ÉTUDIÉS ENTRE 2000 ET 2011¹⁻⁹
La CRT améliore la fonction cardiaque

Amélioration
de la capacité
fonctionnelle
ou de la qualité
de vie^{1,2}

Réduction des
hospitalisations pour
insuffisance cardiaque
^{3,4,6-9}

Amélioration
de la survie
^{3-5,7-9}

Diminution de la mortalité



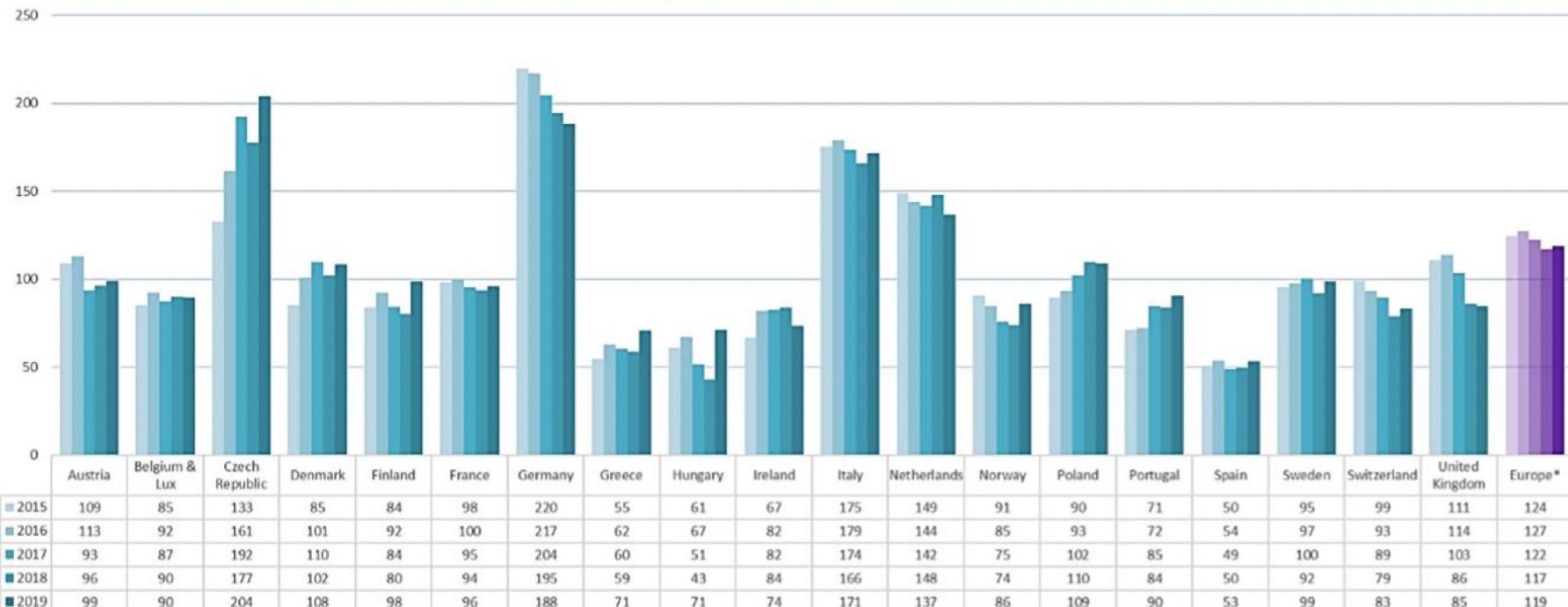
Les résultats proviennent de différentes études et sont donnés à titre indicatif uniquement. Le design, la taille et le type de population des études varient.

1. Abraham W, et al. *N Engl J Med.* 2002;346:1845-1853.
2. Young J, et al. *JAMA.* 2003;289:2685-2694.
3. Bristow MR, et al. *N Engl J Med.* 2004;349:2140-2150.
4. Cleland JG, et al. *N Engl J Med.* 2005;352:1539-1549.
5. Cleland JG, et al. *Eur Heart J.* 2006;27:1928-1932.

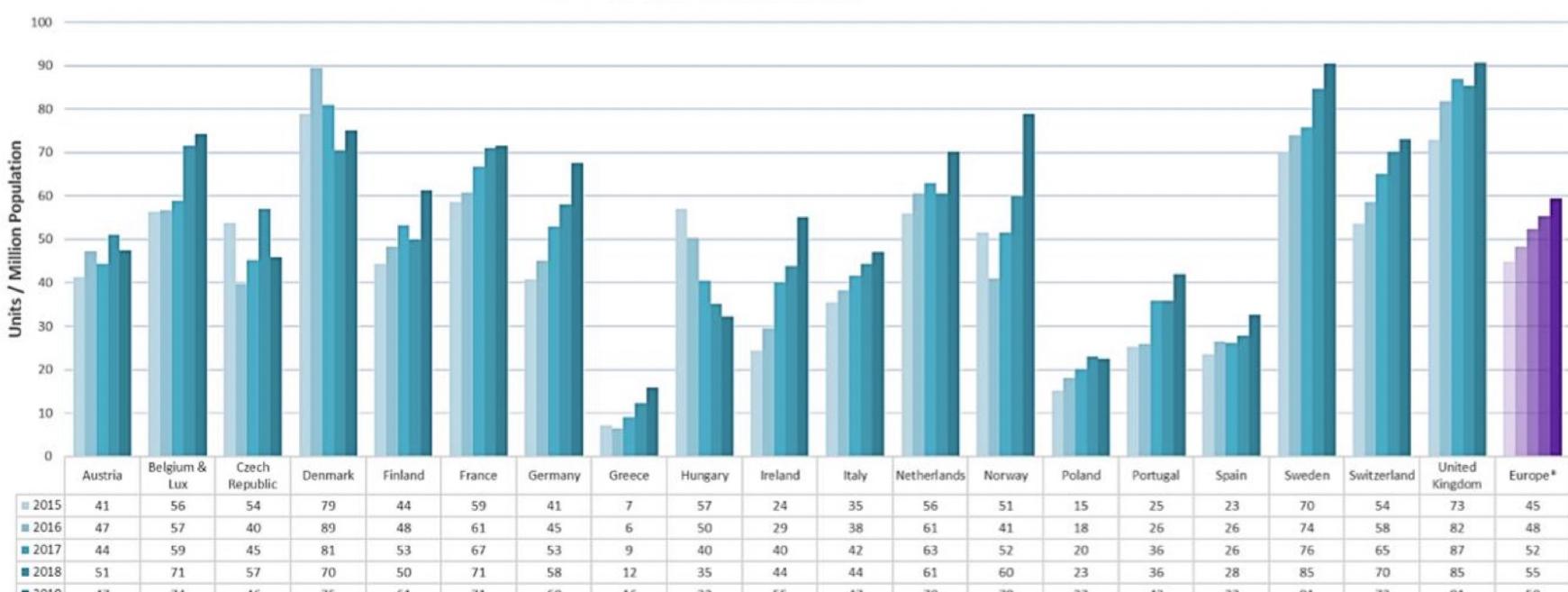
6. Linde C, et al. *J Am Coll Cardiol.* 2008;2:1834-1843.
7. Moss AJ, et al. *N Engl J Med.* 2009;361:1329-1338.
8. Tang AS, et al. *N Engl J Med.* 2010;363:2385-2395.
9. Curtis AB, et al. *N Engl J Med.* 2013;368:1585-1593.

1. Tang AS, et al. *N Engl J Med.* 2010;363:2385-2395.
2. Bristow MR, et al. *N Engl J Med.* 2004;349:2140-2150.
3. Cleland JG, et al. *Eur Heart J.* 2006;27:1928-1932.

CRT-D - Units per million inhabitants



CRT-P - Units per million inhabitants



Optimized implementation of cardiac resynchronization therapy: a call for action for referral and optimization of care

A joint position statement from the Heart Failure Association (HFA), European Heart Rhythm Association (EHRA), and European Association of Cardiovascular Imaging (EACVI) of the European Society of Cardiology

Wilfried Mullens^{1,2*}, Angelo Auricchio³, Pieter Martens^{1,2}, Klaus Witte⁴, Martin R. Cowie⁵, Victoria Delgado⁶, Kenneth Dickstein⁷, Cecilia Linde⁸, Kevin Vernooy^{9,10}, Francisco Leyva¹¹, Johann Bauersachs¹², Carsten W. Israel¹³, Lars H. Lund¹⁴, Erwan Donal¹⁵, Giuseppe Borani¹⁶, Tiny Jaarsma^{17,18}, Antonio Berrezzo¹⁹, Vassil Traykov²⁰, Zaheer Yousef²¹, Zbigniew Kalarus²², Jens Cosedis Nielsen²³, Jan Steffel²⁴, Panos Vardas²⁵, Andrew Coats²⁶, Petar Seferovic²⁷, Thor Edvardsen²⁸, Hein Heidbuchel²⁹, Frank Ruschitzka³⁰, and Christophe Leclercq¹⁵

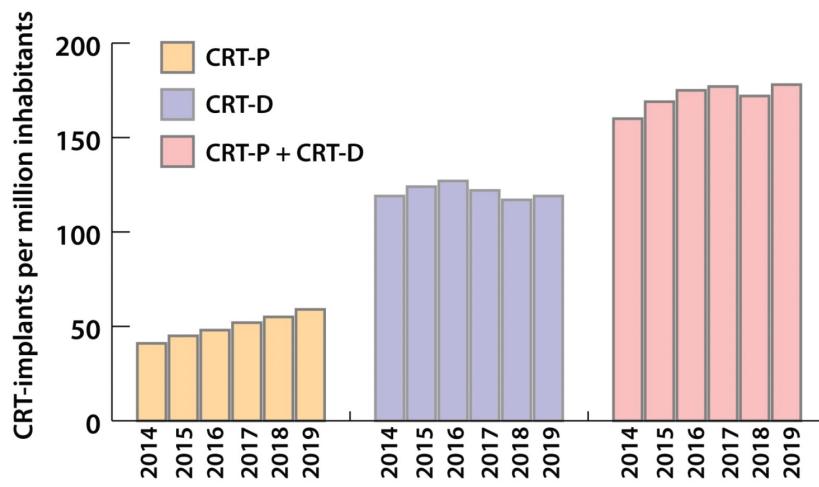


Figure 1 Cardiac resynchronization therapy pacemaker (CRT-P) and cardiac resynchronization therapy defibrillator (CRT-D) implants in Europe between 2014 and 2019. Source: <https://www.medtecheurope.org/>.

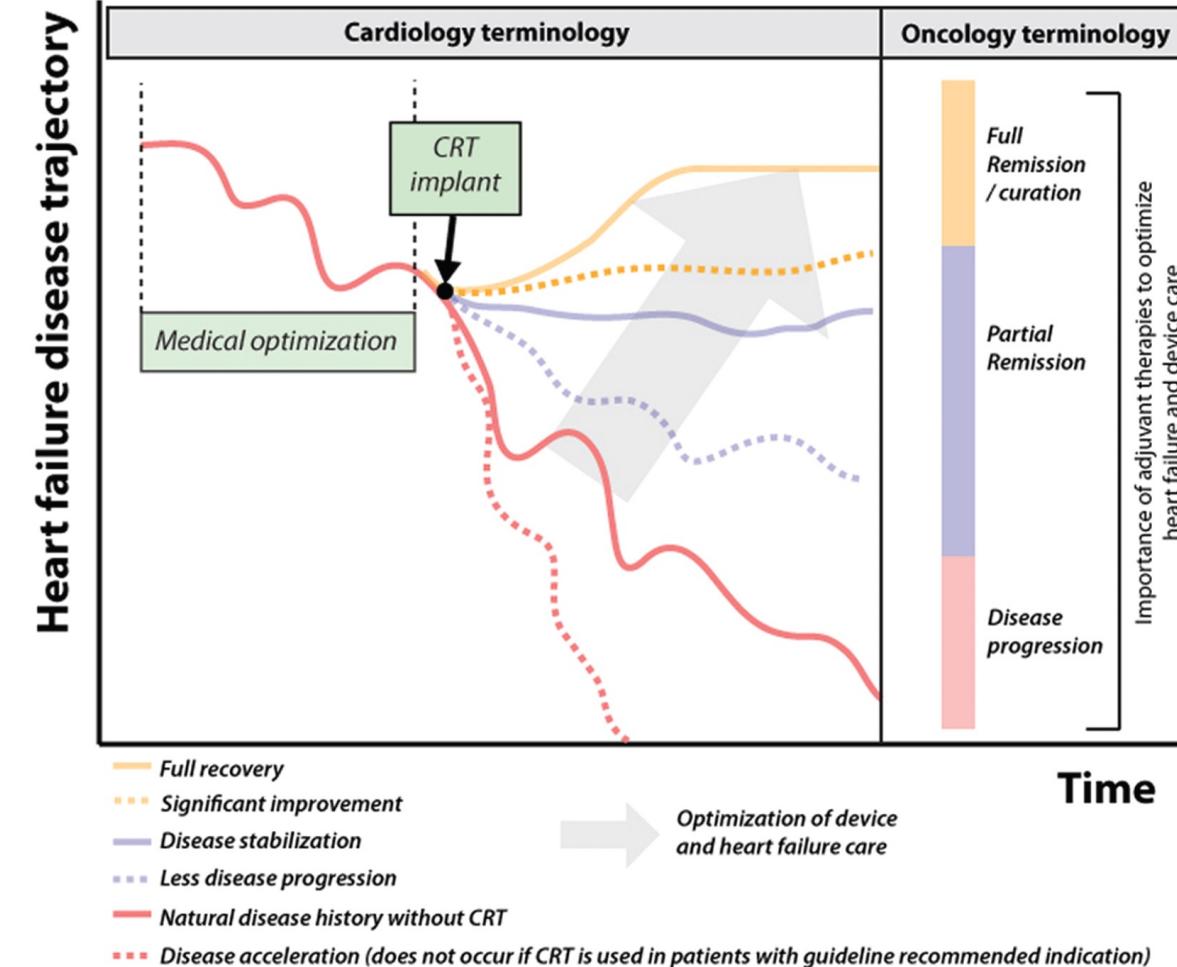


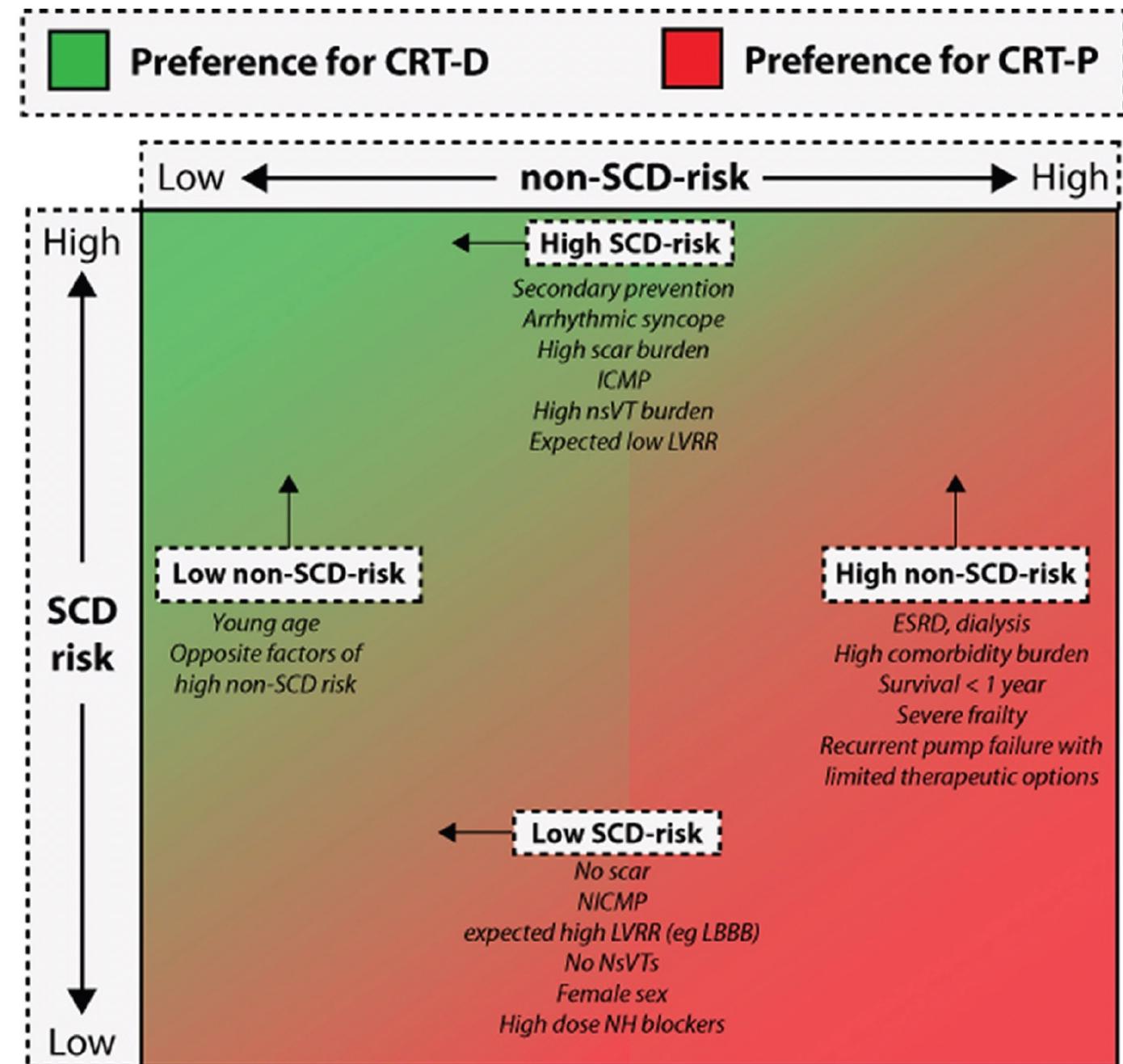
Figure 2 Role of cardiac resynchronization therapy (CRT) in disease modification of the heart failure disease trajectory. The grey arrow indicates the role of auxiliary heart failure optimization following CRT implant.

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Conceptual framework for individualizing of prescription of CRT-P vs. CRT-D

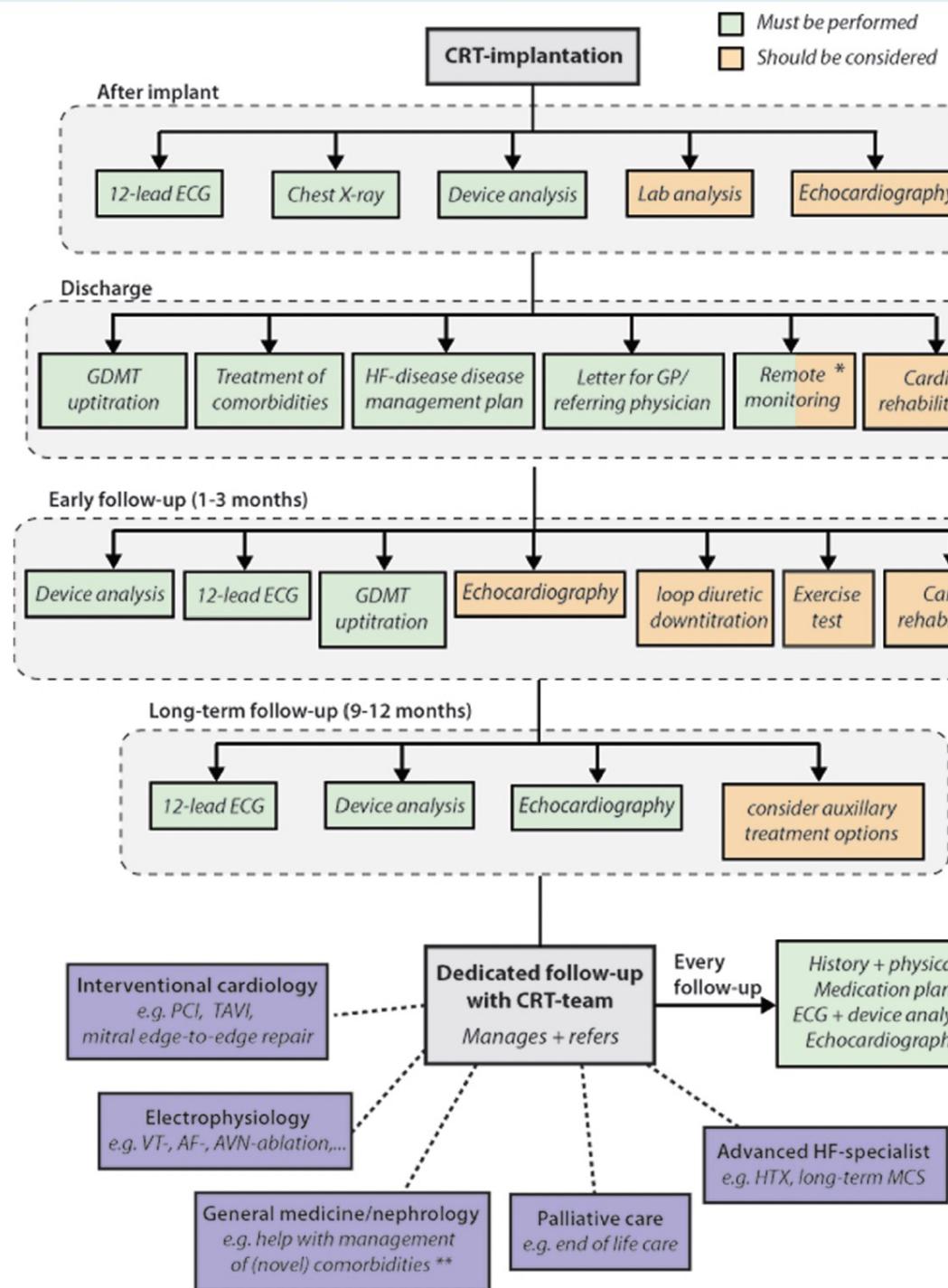


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Structured post-implant CRT care.



État des lieux de l'utilisation de la CRT

Une sous-utilisation de la thérapie – Consensus d'expert EHRA

1

Surmonter la sous-utilisation de la CRT

- Malgré les diverses améliorations et perfectionnement apportés au traitement médicamenteux et les critères d'implantation, une adoption optimale de la CRT nécessiterait environ 400 implantations par million
- **Jusqu'à 2/3 des patients éligibles ne sont pas implantés**

2

Remplacer “Réponse” par “Modification de la maladie”

- Le concept “unique” et “répandu” d’absence de réponse ou “non répondeur” exacerbe la sous utilisation de la CRT.
- L’absence de réponse consensuelle signifie que l’on ne sait pas comment et quand parle-t-on d’amélioration ou quelle est son ampleur

3

Meilleure interpretation clinique des caractéristiques pré-implantation

- Impact de la FE et de la FA dans la selection des patients pour bénéficier de la CRT
- Meilleure interprétation de ce qui constitue le traitement medical optimal chez les patients candidats à un CRT

4

Parcours de soin optimisé post implantation

- Reconnaissance que le parcours de soin post-implantation et la formation font défaut.
- Promotion des effets synergiques de la CRT et du traitement medical optimal
- Mention spéciale du remote monitoring et de l’éducation thérapeutique.

Quoi de neuf en resynchronisation ESC 2021

Nouvelles recommandations ESC



ESC

European Society
of Cardiology

European Heart Journal (2021) 00, 1–128
doi:10.1093/eurheartj/ehab368

ESC GUIDELINES

2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)

With the special contribution of the Heart Failure Association (HFA) of the ESC

Authors/Task Force Members: Theresa A. McDonagh* (Chairperson) (United Kingdom), Marco Metra * (Chairperson) (Italy), Marianna Adamo (Task Force Coordinator) (Italy), Roy S. Gardner (Task Force Coordinator) (United Kingdom), Andreas Baumbach (United Kingdom), Michael Böhm (Germany), Haran Burri (Switzerland), Javed Butler (United States of America), Jelena Čelutkienė (Lithuania), Ovidiu Chioncel (Romania), John G.F. Cleland (United Kingdom), Andrew J.S. Coats (United Kingdom), Maria G. Crespo-Leiro (Spain), Dimitrios Farmakis (Greece), Martine Gilard (France), Stephane Heymans



ESC

European Society
of Cardiology

European Heart Journal (2021) 00, 1–94
doi:10.1093/eurheartj/ehab364

ESC GUIDELINES

2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy

Developed by the Task Force on cardiac pacing and cardiac resynchronization therapy of the European Society of Cardiology (ESC)

With the special contribution of the European Heart Rhythm Association (EHRA)

Authors/Task Force Members: Michael Glikson * (Chairperson) (Israel), Jens Cosedis Nielsen* (Chairperson) (Denmark), Mads Brix Kronborg (Task Force Coordinator) (Denmark), Yoav Michowitz (Task Force Coordinator) (Israel), Angelo Auricchio (Switzerland), Israel Moshe Barbash (Israel), José A. Barrabés (Spain), Giuseppe Borlani (Italy), Frieder Braunschweig (Sweden), Michele Brignole (Italy), Haran Burri (Switzerland), Andrew J. S. Coats (United Kingdom), Jean-Claude Deharo (France), Victoria Delgado (Netherlands), Gerhard-Paul Diller (Germany), Carsten W. Israel (Germany), Andre Keren (Israel), Reinoud E. Knops (Netherlands), Dipak Kotecha (United Kingdom), Christophe Leclercq (France),

Quoi de neuf en resynchronisation ESC 2021

Classification de l'insuffisance cardiaque

HFrEF HF with reduced EF	HFmrEF HF with mildly reduced EF	HFpEF HF with preserved EF
EF ≤40%	EF 41-49%	EF ≥50%

Morphologie du QRS	ESC stimulation 2021		ESC stimulation 2013	
BBG	QRS > 150 ms	Classe I	QRS > 150 ms	Classe I
	130 ms < QRS < 150 ms	Classe IIa	120 ms < QRS < 150 ms	Classe I
	QRS < 130 ms sans indication de stimulation	Classe III	QRS < 120 ms	Classe III
Non-BBG	QRS > 150 ms	Classe IIa	QRS > 150 ms	Classe IIa
	130 ms < QRS < 150 ms	Classe IIb	120 ms < QRS < 150 ms	Classe IIb

Recommendations for cardiac resynchronization therapy in patients in sinus rhythm (1)



Recommendations	Class	Level
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.	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.	IIa	B

CRT = cardiac resynchronization therapy; HF = heart failure; LBBB = left bundle branch block; LVEF = left ventricular ejection fraction; OMT = optimal medical therapy; SR = sinus rhythm.

Recommendations for cardiac resynchronization therapy in patients in sinus rhythm (2)



Recommendations	Class	Level
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.	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.	IIb	B
QRS duration		
CRT is not indicated in patients with HF and QRS duration <130 ms without an indication for RV pacing.	III	A

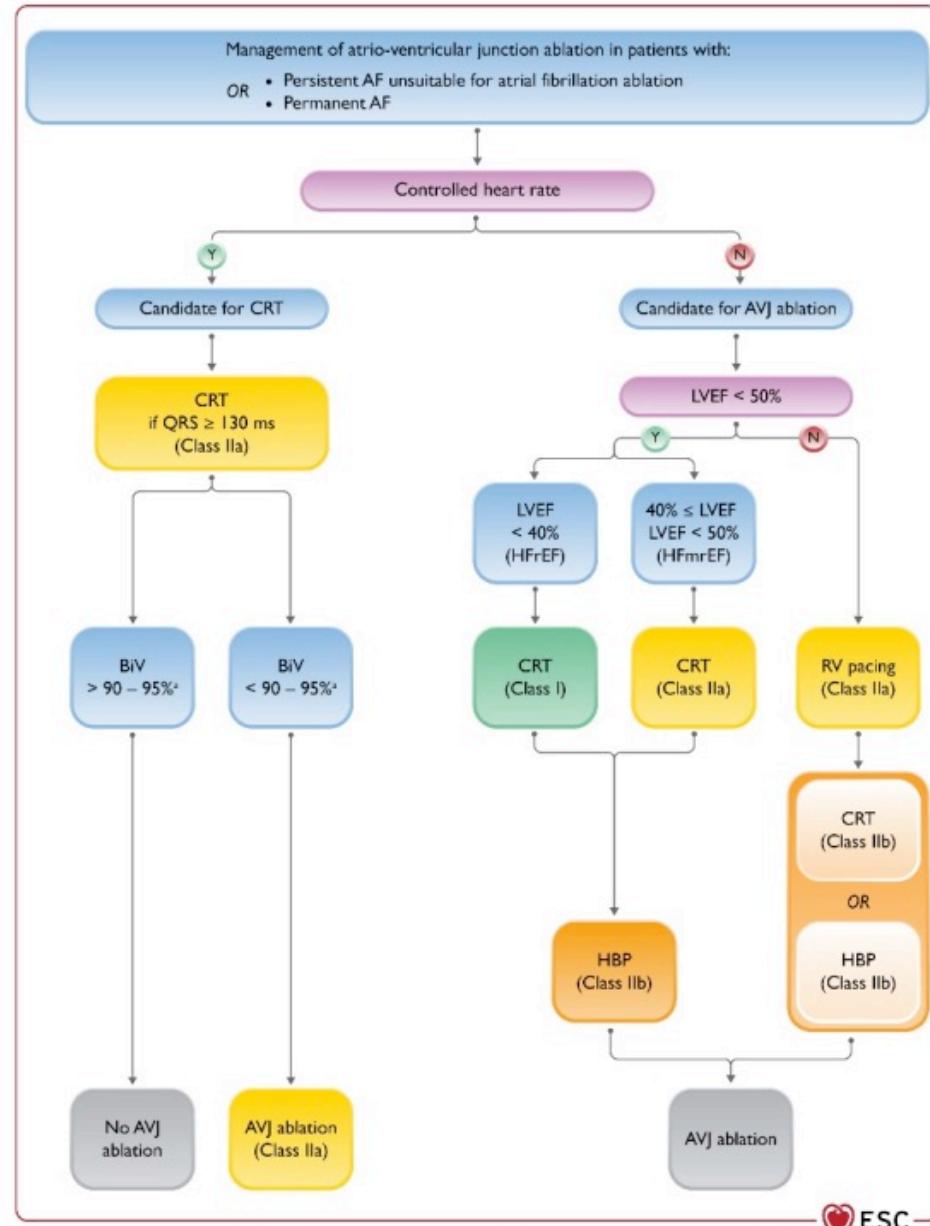
CRT = cardiac resynchronization therapy; HF = heart failure; LBBB = left bundle branch block; LVEF = left ventricular ejection fraction; OMT = optimal medical therapy; SR = sinus rhythm.

©ESC

FA et ablation de la jonction AV

ESC stimulation 2021			ESC stimulation 2013	
FEVG<35%	CRT	Classe I		
35%<FEVG<50%	CRT	Classe IIa		
FE > 50%	CRT Stimulation VD conventionnelle	Classe IIb Classe IIa	FE diminuée	Classe IIa

Indication for atrioventricular junction ablation in patients with symptomatic permanent atrial fibrillation or persistent atrial fibrillation unsuitable for atrial fibrillation ablation



AF = atrial fibrillation; AVJ = atrioventricular junction; BiV = biventricular; CRT = cardiac resynchronization therapy; ESC = European Society of Cardiology; HBP = His bundle pacing; HFmrEF = heart failure with mildly reduced ejection fraction; HFrEF = heart failure with reduced ejection fraction; LVEF = left ventricular ejection fraction; QRS = Q, R, and S waves; RV = right ventricular/right ventricle.

^a Due to a rapid ventricular response.

Note: Figure based on the recommendations in the ESC guidelines on AF.

Recommendations for cardiac resynchronization therapy in patients with persistent or permanent atrial fibrillation (1)

Recommendations	Class	Level
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.	IIa	C
1B) AVJ ablation should be added in case of incomplete biventricular pacing (<90–95%) due to conducted AF.	IIa	B

AF = atrial fibrillation; AVJ = atrioventricular junction; CRT = cardiac resynchronization therapy; EF = ejection fraction; HF = heart failure; HFrEF = heart failure with reduced ejection fraction (<40%); HFmrEF = heart failure with mildly reduced ejection fraction (40–49%); HFpEF = heart failure with preserved ejection fraction (≥50%) according to the 2021 ESC HF guideline; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association; RV = right ventricular.

Recommendations for cardiac resynchronization therapy in patients with persistent or permanent atrial fibrillation (2)

Recommendations	Class	Level
2) In patients with symptomatic AF and an uncontrolled heart rate who are candidates for AVJ ablation (irrespective of QRS duration):		
2A) CRT is recommended in patients with HFrEF.	I	B
2B) CRT rather than standard RV pacing should be considered in patients with HFmrEF.	IIa	C
2C) RV pacing should be considered in patients with HFpEF.	IIa	B
2D) CRT may be considered in patients with HFpEF.	IIb	C

AF = atrial fibrillation; AVJ = atrioventricular junction; CRT = cardiac resynchronization therapy; EF = ejection fraction; HF = heart failure; HFrEF = heart failure with reduced ejection fraction (<40%); HFmrEF = heart failure with mildly reduced ejection fraction (40–49%); HFpEF = heart failure with preserved ejection fraction ($\geq 50\%$) according to the 2021 ESC HF guideline; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association; RV = right ventricular.

**AV junction ablation and cardiac
resynchronization for patients with permanent
atrial fibrillation and narrow QRS: the
APAF-CRT mortality trial**

APAF-CRT

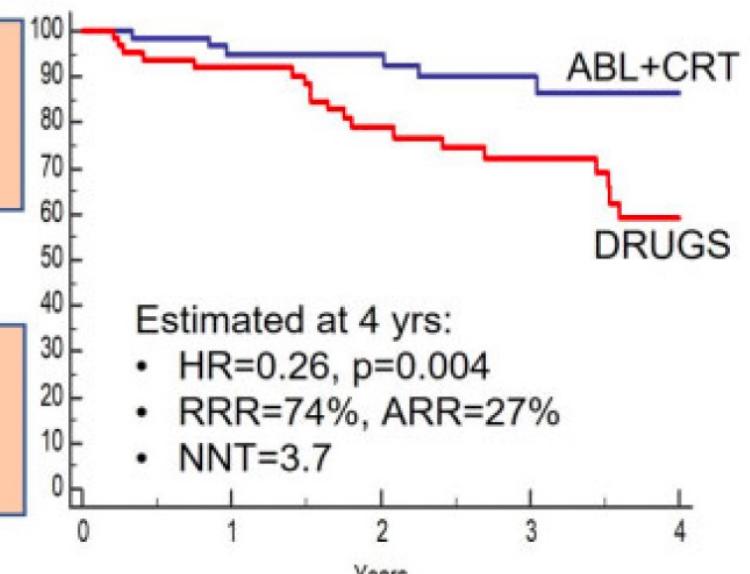
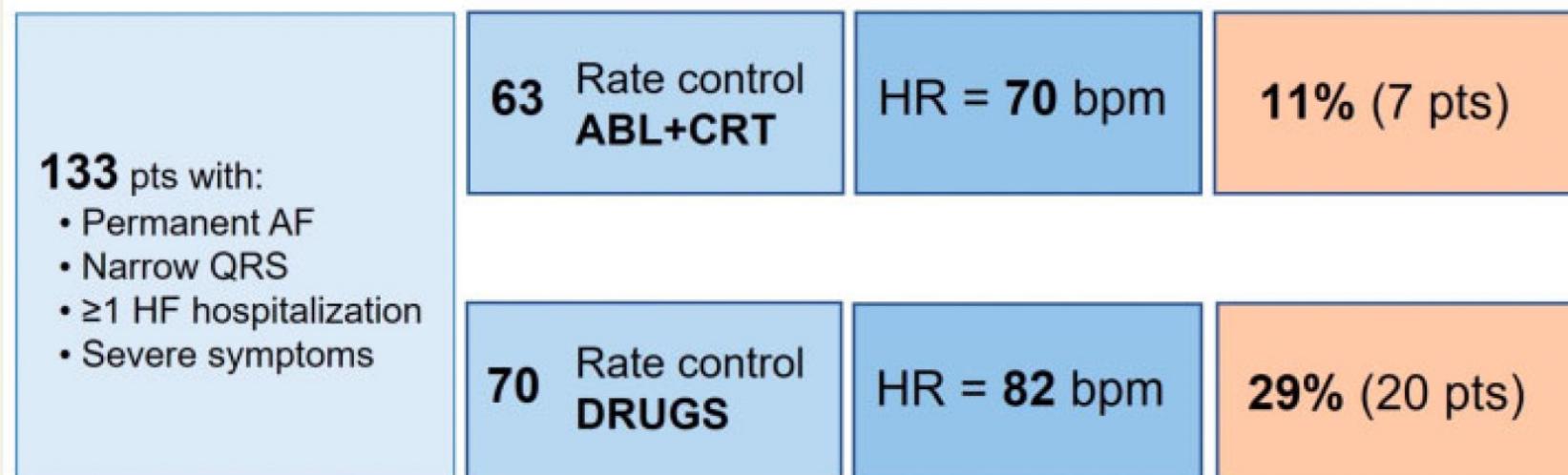
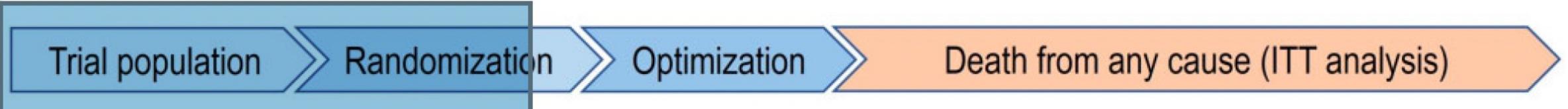
Michele Brignole  ^{1,2*}, Francesco Pентimalli  ³, Pietro Palmisano  ⁴,
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Gianfranco Parati ^{2,16}, Davide Soranna ¹⁷, Michiel Rienstra ¹⁸, and
Isabelle C. Van Gelder ¹⁸; for the APAF-CRT Trial Investigators[†]

- International, open-label, blinded outcome trial,
- Severely symptomatic permanent AF >6 months, narrow QRS (≤ 110 ms) and at least one HF hospitalization in the previous year randomized to
 - Ablation + CRT or
 - Pharmacological rate control.
- Hypothesis : Ablation + CRT >in reducing the primary endpoint of all-cause mortality.
- 133 patients randomized.
- Mean age was : 73 ± 10 y, and 47% females.
- The trial was stopped for efficacy at interim analysis after 29 M of follow-up per pt

AV junction ablation and cardiac resynchronization for patients with permanent atrial fibrillation and narrow QRS: the APAF-CRT mortality trial

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AV junction ablation and cardiac resynchronization for patients with permanent atrial fibrillation and narrow QRS: The APAF-CRT Mortality Trial. Brignole M et al.



AV junction ablation and cardiac resynchronization for patients with permanent atrial fibrillation and narrow QRS: the APAF-CRT mortality trial

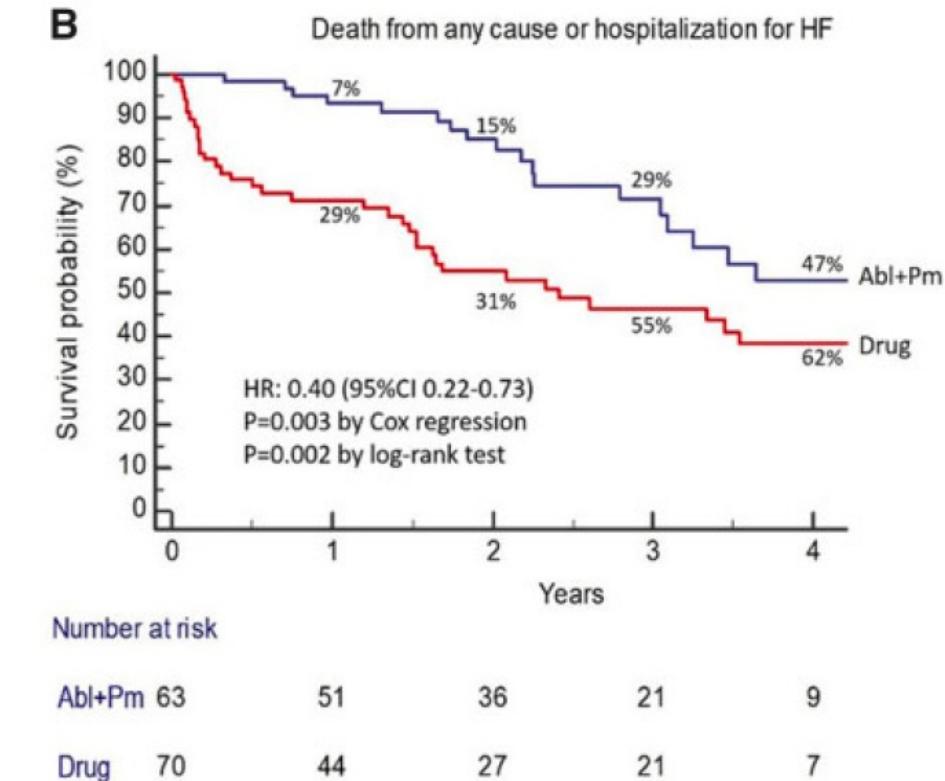
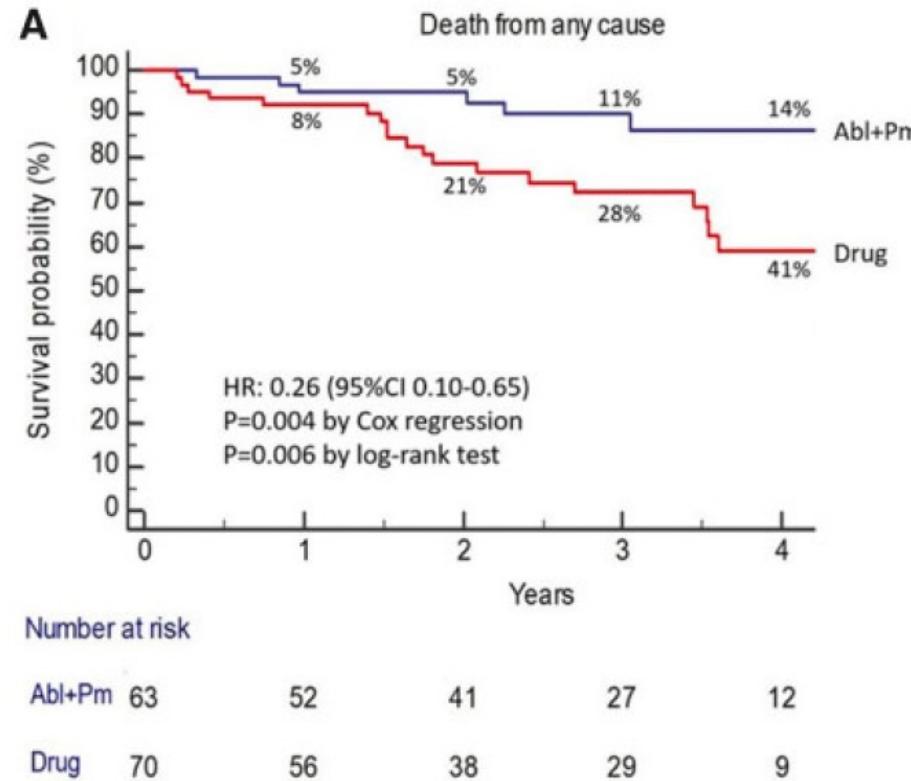
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	Ablation + CRT (n = 63)	Drug (n = 70)
Age (years)	72 ± 11	74 ± 9
Male sex	35 (56)	36 (51)
Body mass index (kg/m ²)	27.6 ± 4.8	28.8 ± 7.4
Systolic blood pressure (mmHg)	123 ± 16	119 ± 15
History of AF		
Duration of permanent AF (months)	19 (8–48)	18 (8–38)
Previous paroxysmal AF	27 (43)	27 (39)
Duration of paroxysmal AF (months)	24 (10–53)	20 (12–48)
Previous electrical cardioversion/s	22 (35)	30 (43)
Previous attempt/s at catheter ablation of AF	5 (8)	8 (11)
Number of hospitalizations for HF in the previous year	1.5 ± 0.8	1.7 ± 1.1
Symptoms and physical capacity		
New York Heart Association Class ≥III	42 (67)	49 (70)
Specific symptoms of AF (total score 0–60)	28.3 ± 10.2	30.1 ± 9.2
Palpitations (score 0–10)	4.7 ± 3.6	4.8 ± 3.7
Effort dyspnoea (shortness of breath during physical activity) (score 0–10)	7.3 ± 2.4	8.0 ± 1.7
Rest dyspnoea (shortness of breath at rest) (score 0–10)	3.6 ± 2.8	4.0 ± 3.1
Exercise intolerance (fatigue during mild physical activity) (score 0–10)	7.1 ± 2.2	7.6 ± 2.1
Easy fatigue at rest (score 0–10)	3.6 ± 2.9	3.8 ± 3.0
Chest discomfort (score 0–10)	2.1 ± 2.7	2.0 ± 2.4
Standard electrocardiogram on enrolment		
Heart rate (at enrolment) (b.p.m.)	101 ± 22	103 ± 19
Heart rate (after optimization at 30 days) (b.p.m.)	70 (70–75)	82 (65–90)*
QRS width (ms)	95 ± 12	94 ± 12
Echocardiogram		
Ejection fraction	41 ± 12	41 ± 12
Ejection fraction ≤35%	27 (43)	28 (40)
Median	30 (25–31)	30 (26–34)
Ejection fraction >35%	36 (57)	42 (60)
Medications (after optimization at 30 days)		
Digoxin	20 (32)	42 (60)**
Verapamil/diltiazem	8 (13)	8 (11)
Amiodarone/sotalol	1 (2)	7 (10)
Beta-blockers	51 (81)	61 (87)
Diuretics	58 (92)	66 (94)
Angiotensin-converting enzyme inhibitors or receptor blocker	41 (65)	38 (54)
Mineralocorticoid antagonist	29 (46)	33 (47)
Other vasodilators	14 (22)	14 (20)
Antiplatelets	10 (16)	13 (19)
Anticoagulants	60 (95)	64 (91)

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Isabelle C. Van Gelder ¹⁸; for the APAF-CRT Trial Investigators

➤ Mean LV EF = 41%



Ablation + CRT was superior to pharmacological therapy in reducing mortality in patients with permanent AF and narrow QRS who were hospitalized for HF, irrespective of their baseline EF.

Recommendation for upgrade from right ventricular pacing to cardiac resynchronization therapy



Recommendations	Class	Level
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 ^a proportion of RV pacing, should be considered for upgrade to CRT.	IIa	B

CRT = cardiac resynchronization therapy; HF = heart failure; ICD = implantable cardioverter-defibrillator; LVEF = left ventricular ejection fraction; OMT = optimal medical therapy; RV = right ventricular.

^aA limit of 20% RV pacing for considering interventions for pacing-induced HF is supported by observational data. However, there are no data to support that any percentage of RV pacing can be considered as defining a true limit below which RV pacing is safe and beyond which RV pacing is harmful.

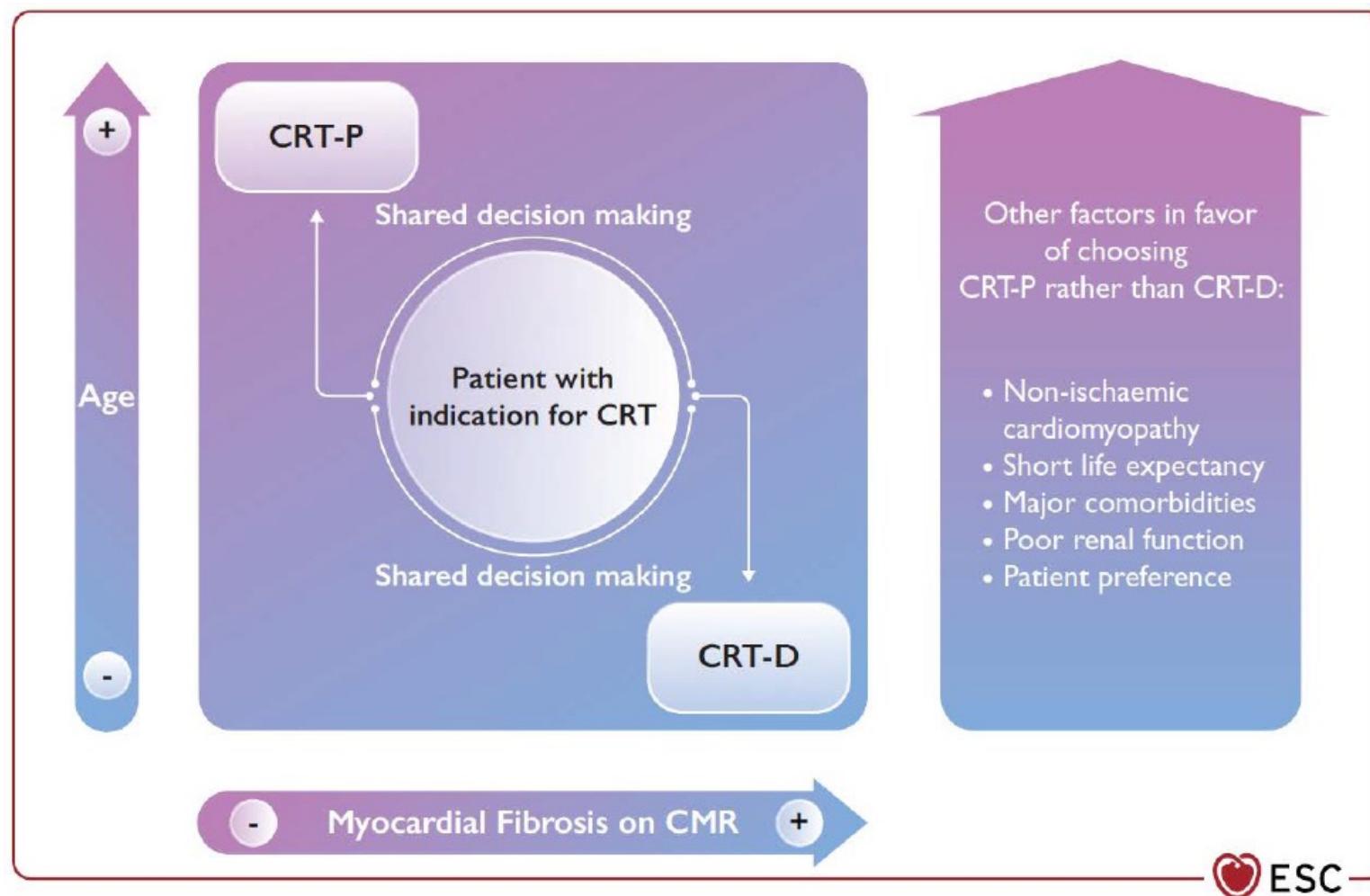
Recommendation for patients with heart failure and atrioventricular block



Recommendations	Class	Level
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.	I	A

AF = atrial fibrillation; AVB = atrioventricular block; CRT = cardiac resynchronization therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction (<40%) according to the 2021 ESC HF guideline; NYHA = New York Heart Association; RV = right ventricular.

Quoi de neuf en resynchronisation ESC 2021 CRT-P versus CRTD



Recommendations for adding a defibrillator with cardiac resynchronization therapy

Recommendations	Class ^a	Level ^b
In patients who are candidates for an ICD and who have CRT indication, implantation of a CRT-D is recommended. ^{260,369,370,381}	I	A
In patients who are candidates for CRT, implantation of a CRT-D should be considered after individual risk assessment and using shared decision-making. ^{382,383}	IIa	B

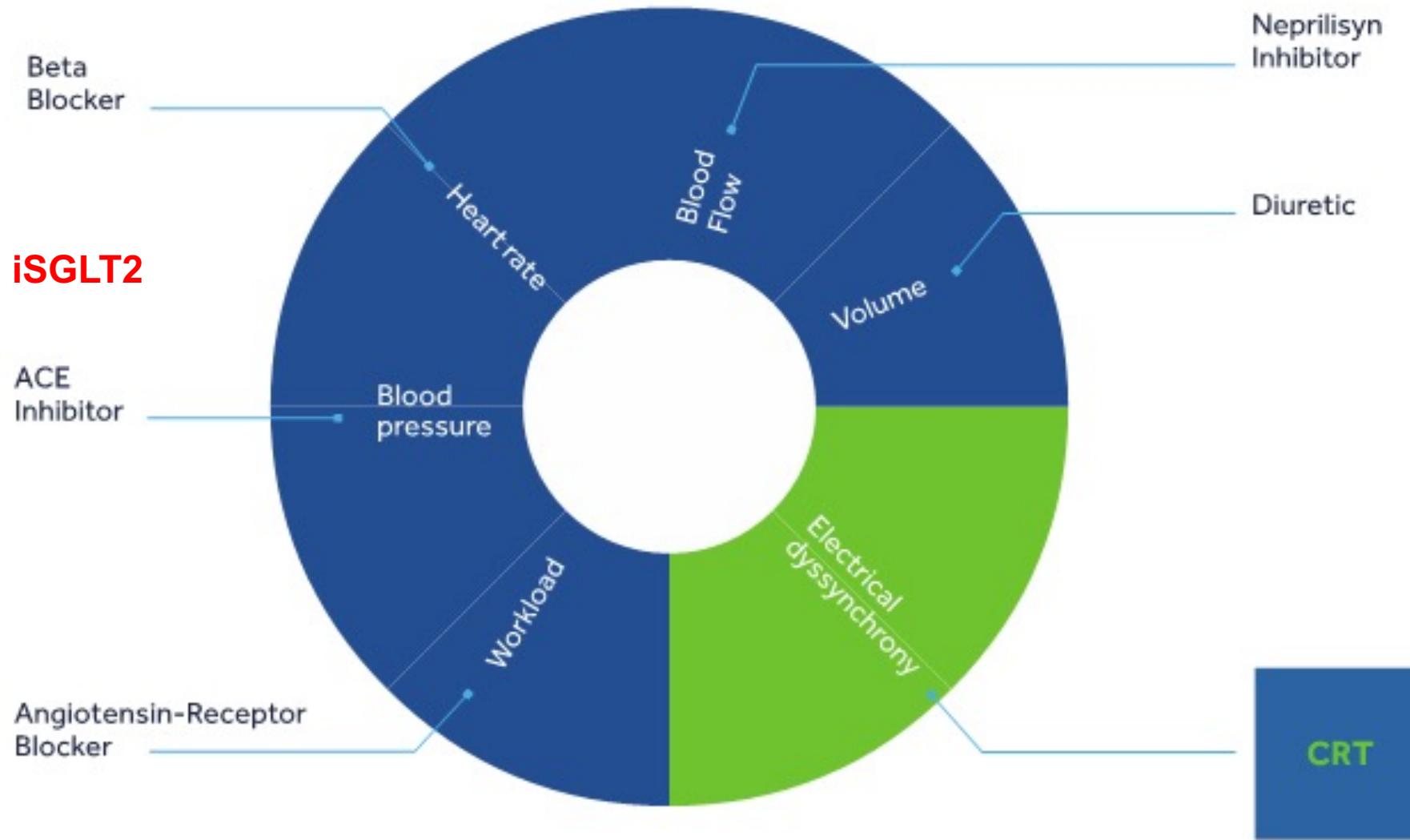
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CRT = cardiac resynchronization therapy; CRT-D = defibrillator with cardiac resynchronization therapy; ICD = implantable cardioverter-defibrillator.

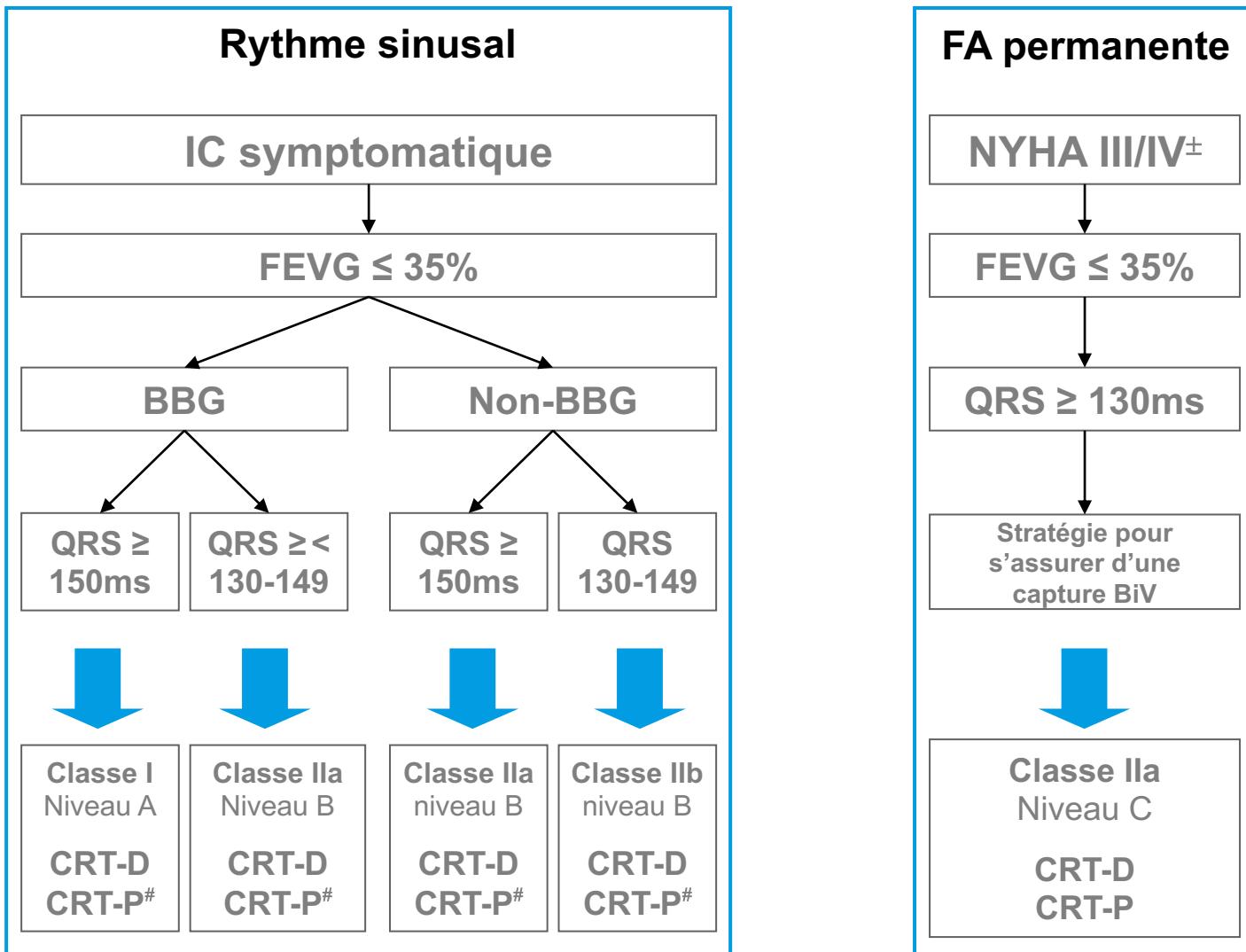
^aClass of recommendation.

^bLevel of evidence.

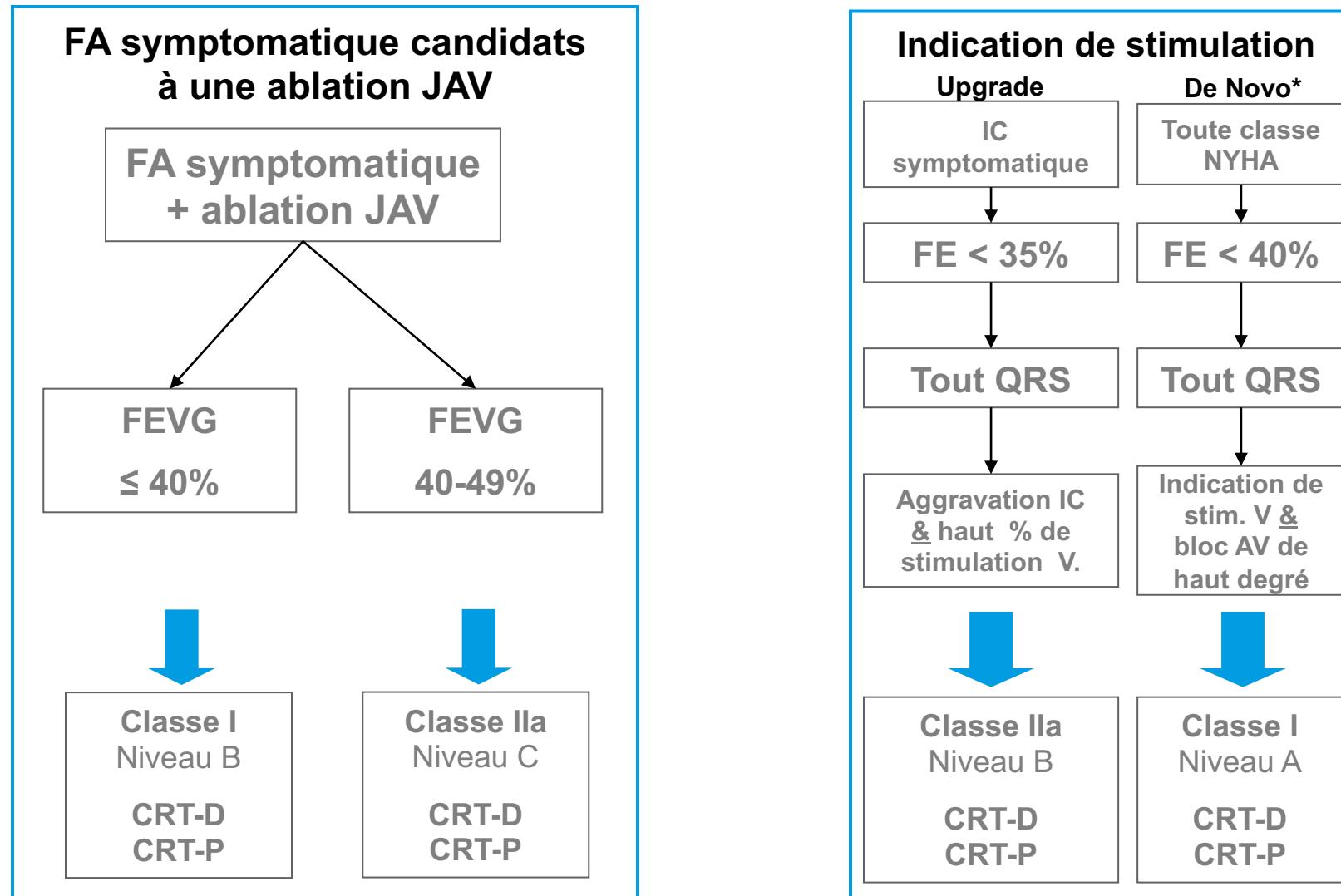
Recommandations ESC 2021: résumé



Recommandations ESC 2021: résumé



Recommandations ESC 2021: résumé



Les patients doivent être sous traitement médical optimal

*Inclut les patients en FA