Device Therapy Recommendations In Recent Heart Failure Guidelines: A Closer Look

Recent guidelines released by two sides of Atlantic (1, 2) provide a general roadmap for medical community dealing with heart failure management. In these guidelines heart failure patients are classified according to their ejection fraction (EF) values: Heart Failure with Preserved EF (HFpEF), Heart Failure with Mildly Reduced EF (HFmrEF) and Heart Failure with Reduced EF (HFrEF). Non-pharmacological and pharmacological treatment options are recommended in these guidelines in relevant sections pertaining to heart failure subgroups. Device therapy is mainly restricted to HFrEF patients due to clinical data obtained from this heart failure subgroup. We aimed to highlight two guideline's similarities and differences in device therapy recommendations for a busy clinician.

A) ICD Therapy

Secondary Prevention

2021 ESC guideline makes only secondary prevention recommendation for ICD therapy. 2022 AHA/ACC/HFSA guideline does not mention about secondary prevention.

Class/ LOE	2021 ESC
1a	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 hemodynamic 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

Class /LOE: The recommendation's class and Level of Evidence

Primary Prevention

Both guidelines have recommendations very close to each other about ICD therapy in a HFrEF patient having NYHA class II-III symptoms. Only 2022 AHA/ACC/HFSA guideline makes specific ICD therapy recommendation about HFrEF patient with NYHA class I symptoms. EF cut-off value to be eligible for ICD therapy in these patients is <30% instead of <35% (Class 1b).

Being ischemic or nonischemic HFrEF patient does not change ICD therapy recommendation in 2022 AHA/ACC/HFSA guideline but 2021 ESC guideline put a separate treatment proposal for patients with non-ischemic etiology (Class 2a).

In patients with genetic arrhythmogenic cardiomyopathy having high-risk features of sudden death and EF≤45 implantation of ICD is reasonable (Class 2a).

Address for Correspondence: Oben Baysan, Guven Hospital, Ankara, Turkey
Email: obbaysan@@gmail.com
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Class / LOE	2022 AHA/ACC/HFSA	Class / LOE	2021 ESC
1a	In patients with nonischemic dilated cardiomyopathy (DCM) or ischemic heart disease at least 40 days post-MI with LVEF ≤35% and NYHA class II or III symptoms on chronic GDMT, who have reasonable expectation of meaningful survival for >1 year, ICD therapy is recommended for primary prevention of SCD to reduce total mortality	1a	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 ischemic etiology (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
1b	In patients at least 40 days post-MI with LVEF ≤30% and NYHA class I symptoms while receiving GDMT, who have reasonable expectation of meaningful survival for >1 year, ICD therapy is recommended for primary prevention of SCD to reduce total mortality.	2a	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-ischemic etiology, and an LVEF <_35% despite >_3 months of OMT, provided they are expected to survive substantially longer than 1 year with good functional status
2a	In patients with genetic arrhythmogenic cardiomyopathy with high-risk features of sudden death, with EF ≤45%, implantation of ICD is reasonable to decrease sudden death		

The recommendation about a wearable ICD can be found in 2021 ESC guideline.

Class/ LOE	2021 ESC Guideline
2b	A wearable ICD may be considered for patients with HF who are at risk of sudden cardiac death for a limited period or as a bridge to an implanted device

"Don't do it" sections of both guidelines about ICD therapy point to different clinical scenarios.
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Class/ LOE	2022 2022 AHA/ACC/HFSA	Class/ LOE	2021 ESC
3	For patients whose comorbidities or frailty limit survival with good functional capacity to <1 year, ICD and cardiac resynchronization therapy with defibrillation (CRT-D) are not indicated	3	ICD implantation is not recommended within 40 days of a MI as implantation at this time does not improve prognosis
		3	ICD therapy is not recommended in patients in NYHA class IV with severe symptoms refractory to pharmacological therapy unless they are candidates for CRT, a VAD, or cardiac transplantation

B) CRT Therapy

CRT in HFrEF patients with LBBB (QRS duration ≥150 ms)

The patient's clinical status, ECG data and echocardiographic measurements are needed for reaching a decision about CRT treatment.

In ESC guideline the presence of any degree of symptoms is enough for making any heart failure patient with sinus rhythm + left bundle brunch block (LBBB) +QRS duration ≥150 msec taking optimal medical therapy to be eligible for CRT therapy (Class 1a). AHA/ACC/HFSA guideline also needs the presence of NYHA Class II-III-IV symptoms for making recommendation (Class 1b) but provides a distinct CRT treatment option for patients with NYHA class I symptoms (Class 2b).

Class/ LOE	2022 2022 AHA/ACC/HFSA	Class/ LOE	2021 ESC
1b	For patients who have LVEF ≤35%, sinus rhythm, left bundle branch block (LBBB) with a QRS duration ≥150 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT, CRT is indicated to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL	1a	CRT is recommended for symptomatic patients with HF in SR with a QRS duration ≥ 150 ms and LBBB QRS morphology and with LVEF <_35% despite OMT in order to improve symptoms and reduce morbidity and mortality
2b	For patients who have LVEF ≤30%, ischemic cause of HF, sinus rhythm, LBBB with a QRS duration ≥150 ms, and NYHA class I symptoms on GDMT, CRT may be considered to reduce hospitalizations and improve symptoms and QOL		
*GDMT Guideline directed medical treatment, QOL Quality of Life			

CRT in HFrEF patients with LBBB (QRS duration <150 ms)

A HFrEF patient with sinus rhythm+ left bundle branch block but QRS duration <150 msec has a different CRT treatment recommendations from these two guidelines. AHA/ACC/HFSA is using a QRS duration of 120-149 ms but cut-off value in the ESC guideline is 130-149 ms.

Class/ LOE	2022 AHA/ACC/HFSA	Class/ LOE	2021 ESC
2a	For patients who have LVEF ≤35%, sinus rhythm, LBBB with a QRS duration of 120 to 149 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT, CRT can be useful to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL	2a	CRT should be considered for symptomatic patients with HF in SR with a QRS duration of 130-149 ms and LBBB QRS morphology and with LVEF <_35% despite OMT in order to improve symptoms and reduce morbidity and mortality

CRT in HFrEF patients with non-LBBB QRS morphology (QRS duration ≥150 ms)

Class/ LOE	2022 AHA/ACC/HFSA	Class/ LOE	2021 ESC
2a	For patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with a QRS duration ≥150 ms, and NYHA class II, III, or ambulatory class IV symptoms on GDMT, CRT can be useful to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL	2a	CRT should be considered for symptomatic patients with HF in SR with a QRS duration ≥150 ms and non-LBBB QRS morphology and with LVEF <_35% despite OMT in order to improve symptoms and reduce morbidity and mortality.

CRT in HFrEF patients with non-LBBB QRS morphology (QRS duration <150 ms)

Different cut off values are used: 120-149 ms for AHA/ACC/HFSA, 130-149 ms for ESC guideline. Furthermore, 2022 AHA/ACC/HFSA guideline restricts CRT therapy option in such a patient to presence of with NYHA Class III or ambulatory class IV symptoms.

Class/ LOE	**2022 AHA/ACC/HFSA**	**Class/ LOE**	**2021 ESC**
2b	For patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with QRS duration of 120 to 149 ms, and NYHA class III or ambulatory class IV on GDMT, CRT may be considered to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL	2b	CRT may be considered for symptomatic patients with HF in SR with a QRS duration of 130-149 ms and non-LBBB QRS morphology and with LVEF <_35% despite OMT in order to improve symptoms and reduce morbidity and mortality
3	For patients with NYHA class I or II symptoms and non-LBBB pattern with QRS duration <150 ms, CRT is not recommended		

CRT in HFrEF patients with Atrial Fibrillation

While 2022 AHA/ACC/HFSA guideline make a specific recommendation in HFrEf patients with Atrial fibrillation (AF) in the relevant table (Class 2a), 2021 ESC guideline proposes a relatively weak recommendation mentioned in the guideline's text.

Class/ LOE	**2022 AHA/ACC/HFSA**	**Class/ LOE**	**2021 ESC**
2a	In patients with AF and LVEF ≤35% on GDMT, CRT can be useful to reduce total mortality, improve symptoms and QOL, and increase LVEF, if: a) the patient requires ventricular pacing or otherwise meets CRT criteria and b) atrioventricular nodal ablation or pharmacological rate control will allow near 100% ventricular pacing with CRT.	2b	In view of the paucity of evidence for the efficacy of CRT in patients with AF, it may be an option in selected patients—particularly those with a QRS >_150 ms—ensuring a proportion of biventricular pacing as high as possible

Other recommendations about CRT in HFrEF patients

Class/ LOE	2022 AHA/ACC/HFSA	Class/ LOE	2021 ESC
2a	For patients on GDMT who have LVEF ≤35% and are undergoing placement of a new or replacement device implantation with anticipated requirement for significant (>40%) ventricular pacing, CRT can be useful to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL	1a	CRT rather than RV pacing is recommended for patients with HFrEF regardless of NYHA class or QRS width who have an indication for ventricular pacing for high degree AV block in order to reduce morbidity. This includes patients with AF
2a	In patients with high-degree or complete heart block and LVEF of 36% to 50%, CRT is reasonable to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.	2a	Patients with an LVEF <_35% who have received a conventional pacemaker or an ICD and subsequently develop worsening HF despite OMT and who have a significant proportion of RV pacing should be considered for 'upgrade' to CRT

Other "Don't do it" recommendations about CRT therapy in HFrEF patients

Both guidelines are used different QRS duration cut off values for non-eligibility of CRT therapy: 120 ms at the 2022 AHA/ACC/HFSA and <130 ms at the 2021 ESC guidelines.

Class/ LOE	2022 AHA/ACC/HFSA	Class/ LOE	2021 ESC
3	In patients with QRS duration <120 ms, CRT is not recommended	3	CRT is not recommended in patients with a QRS duration <130 ms who do not have an indication for pacing due to high degree AV block
3	For patients whose comorbidities or frailty limit survival with good functional capacity to <1 year, ICD and cardiac resynchronization therapy with defibrillation (CRT-D) are not indicated.		

Oben Baysan, İlke Zehra Yıldız,
[1]Guven Hospital Cardiology Clinic, Ankara, Turkey
[2]Private Cardiology Clinic, Izmir, Turkey

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Albatrosses on beautiful calm shiny Pacific ocean. Alexander Lyakhov, Vladivostok, Russia.