

Evolut Clinical Guideline 321 for Implantable Cardioverter Defibrillator

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Statement

General Information

GENERAL INFORMATION

- It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.
- Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.

Purpose

Indications for determining medical necessity for GENERAL INFORMATION

~~It is an implantable cardiac defibrillator (ICD). Implantable cardioverter defibrillators (ICDs) are indicated for the treatment of life-threatening ventricular tachycardia and ventricular fibrillation.~~ expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.

All indications are predicated on a meaningful life expectancy of greater than one year if the ICD is implanted.

Clinical Reasoning

All criteria are substantiated by the latest evidence-based medical literature. To enhance transparency and reference, Appropriate Use (AUC) scores, when available, are diligently listed alongside the criteria.

This guideline first defaults to AUC scores established by published, evidence-based guidance endorsed by professional medical organizations. In the absence of those scores, we adhere to a standardized practice of assigning an AUC score of 6. This score is determined by considering variables that ensure the delivery of patient-centered care in line with current guidelines, with a focus on achieving benefits that outweigh associated risks. This approach aims to maintain a robust foundation for decision-making and underscores our commitment to upholding the highest standards of care.
(1,2,3,4,5)

INDICATIONS FOR ICD INSERTION⁴⁻⁷

Ischemic Heart Disease (CAD) ^(6,7,8) ~~ISCHEMIC HEART DISEASE (CAD)~~^{1,4,5}

Primary Prevention of SCD ~~(prophylactic ICD implantation)~~

- LVEF \leq 35% due to nonischemic or ischemic heart disease and NYHANYHA class II or III, despite GDMT guideline-directed medical therapy (GDMT), and at least 40 days post-myocardial infarction (MI) ~~and 90 days post-revascularization~~ who have reasonable expectation of meaningful survival of > 1 year (AUC 9)
- LVEF \leq 30% due to ischemic heart disease, NYHANYHA class I, GDMT, ~~GDMT~~, and at least 40 days post-MI ~~and 90 days post-revascularization~~ who have reasonable expectation of meaningful survival of > 1 year (AUC 8)
- LVEF \leq 40% with prior MI, NSVT, and inducible sustained ventricular tachycardia (VT) or ventricular fibrillation (VF) at electrophysiological testing

Secondary Prevention of SCD

- Patients with documented ventricular fibrillation (VF), hemodynamically unstable ventricular tachycardia (VT), or sustained VT, after exclusion of reversible causes (AUC 9)
- Syncope of undetermined origin, with inducible VF or sustained VT at electrophysiological study (AUC 9) ~~EPS~~
- Syncope of undetermined origin, with EF \leq 35% (AUC 8-9)

NONISCHEMIC CARDIOMYOPATHY (NICM) ⁽⁶⁾¹

Primary Prevention of SCD ~~(prophylactic ICD implantation)~~

- Lamin A/C gene mutation, with \geq 2 risk factors from the following: NSVT, LVEF $<$ 45%, male sex, missense mutation
- LVEF \leq 35% and NYHANYHA functional Class II or III, despite at least 3 months of ~~GDMT~~ GDMT: Recommended
- **NOTE:** LVEF \leq 35% and NYHANYHA functional Class I despite at least 3 months of ~~GDMT~~ GDMT: May be considered

Secondary Prevention of SCD

- Patients with documented VF, hemodynamically unstable VT, or sustained VT, after exclusion of reversible causes
- LVEF \leq 50% with unexplained syncope presumed to be due to VA ~~and~~ who do not meet indications for primary prevention ICD implantation

Advanced Heart Failure & Transplantation ^(6,7,8)

~~ADVANCED HEART FAILURE & TRANSPLANTATION~~^{1,5}

- In non-hospitalized patients with NYHANYHA class IV who are candidates for cardiac transplantation or left ventricular assist device (LVAD)^{1,4,5}
- In a patient with an LVAD, sustained ventricular arrhythmias¹
- In NYHA ~~In NYHA~~ ambulatory class IV, with appropriate indications for CRT (see

MYOCARDIAL DISEASES

Hypertrophic cardiomyopathy (HCM) ^(6,8,9,10,11)

- Previously documented cardiac arrest or sustained ~~VT~~ventricular tachycardia
- Adult patients with HCM with at least 1 risk factor for SCD as follows:
 - Sudden death attributable to HCM in at least 1 first-degree relative who is ≤ 50 years of age
 - LVH ≥ 30 mm
 - At least 1 recent (**within 5 years**) episode of syncope suspected by history to be arrhythmic (unlikely neurocardiogenic (vasovagal), ~~and~~ especially occurring within 6 months of evaluation (events beyond 5 years do not appear to have relevance))
 - LV apical aneurysm
 - LV systolic dysfunction (EF $< 50\%$)
- Pediatric patients with HCM with at least 1 risk factor for SCD as follows:
 - ~~Including~~ unexplained syncope
 - LVH ≥ 30 mm
 - Nonsustained ~~VT~~ventricular tachycardia
 - Family history of HCM-related SCD

NOTE: ICD placement for the sole purpose of participation in competitive athletics should not be performed

- **Cardiac Sarcoidosis** with one of the following ^{(6,8,9)1,3,5}:
 - Cardiac arrest or documented sustained VT
 - LVEF $\leq 35\%$ (**AUC 8**)
 - LVEF $> 35\%$ with inducible sustained ~~VA~~ventricular arrhythmia at **electrophysiological testing**EPS
 - Syncope and/or scar on CMR or ~~positron emission tomography (PET)~~
 - Requires a permanent pacemaker
- **Neuromuscular Disorders** ~~(including but not limited to Duchenne, Becker, Limb-girdle type 1B, Limb-girdle type 2C-2F, Limb-girdle type 2I, Myotonic type 1, Myotonic type 2, Emery-Dreifuss, or Facioscapulohumeral~~ **Muscular Dystrophy**) ^{(6,8)4} with one of the following:
 - Primary and secondary prevention, with same indications as for NICM⁵
 - Emery-Dreifuss or limb-girdle type I-B muscular dystrophy with progressive cardiac involvement

Arrhythmogenic right ventricular cardiomyopathy

- ~~With and~~ **at least 1 one** of the following risk factors for SCD ^{(6,9,10)1-3,8,9}:
 - Resuscitated sudden cardiac arrest
 - Sustained VT
 - Right or left ventricular systolic dysfunction with an ~~EF~~ejection fraction \leq

- 35%
- Syncope with documented or presumed ventricular arrhythmia

Channelopathies

Congenital Long QT Syndrome

With one of the following (AUC 9) (6,8,10)

CHANNELOPATHIES

- ~~Congenital long QT syndrome with one of the following^{1, 2, 5, 10, 11}~~
 - Sudden cardiac arrest
 - Sustained VT or recurrent syncope when beta blocker is ineffective or not tolerated
 - QTc > 500 ms on a beta blocker⁴
 - Strong family history of SCD
 - High risk genotype

Brugada syndrome and spontaneous type 1 Brugada Echocardiographic Pattern

- ~~electrocardiographic pattern~~ with **one** of the following (AUC 9) (6,8,10)^{1, 2, 5, 12,}
 - Cardiac arrest
 - Documented sustained VAventricular arrhythmia
 - Syncope presumed to be due to VAventricular arrhythmia
- **Catecholaminergic polymorphic VT** with **one** of the following (AUC 9) (6,7,10)^{1, 2, 4,}
^{13,}
 - Sudden cardiac arrest
 - Syncope or sustained VT
 - Inducible VT or VF
- **Early Repolarization ("J-wave Syndrome") or Short QT Syndrome** with **one** of the following (AUC 9) (6,8)^{1, 5,}
 - Cardiac arrest
 - Sustained VAventricular arrhythmia
- **Idiopathic Polymorphic VT/VF** with **one** of the following:^{(6)^{1,}}
 - Cardiac arrest due to polymorphic VT or VF

ADULT & PEDIATRIC CONGENITAL HEART DISEASE (CHD) (6,7,8,9,11)^{1, 3, 5, 14-16}

- Cardiac arrest due to VF or VT, or unstable VT, after exclusion of a reversible etiology
- Systemic LVEF ≤ 35%, biventricular physiology, and NYHA class II or III on GDMT

- Tetralogy of Fallot with one of the following: ^{1,3}
 - Spontaneous sustained VT
 - Inducible VF or sustained VT
 - ≥ 1 risk from the following list:
 - Prior palliative systemic to pulmonary shunts
 - Unexplained syncope
 - Frequent PVCs (Premature Ventricular Contractions)
 - Atrial tachycardia
 - Left ventricular dysfunction or diastolic dysfunction
 - NSVT
 - QRS duration ≥ 180 ms
 - Dilated right ventricle
 - Residual pulmonary regurgitation or stenosis
 - RV Hypertension
- Single or systemic ~~RVEF~~ **right ventricular ejection fraction (RVEF)** < 35%, in the presence of an additional risk factor such as:
 - NSVT
 - Unexplained syncope
 - NYHA class II or III, despite GDMT^{4,5}
 - QRS duration ≥ 140 ms
 - Severe systemic AV valve regurgitation
- Syncope of unknown origin in the presence of either at least moderate ventricular dysfunction or marked hypertrophy or inducible sustained VT or VF^{4,3}
- Syncope and moderate or severe complexity CHD, with high clinical suspicion of **VA** ~~ventricular arrhythmias~~
- Non-hospitalized patients with CHD awaiting heart transplantation
- Left ventricular non-compaction that meets same indications as NICM, including a familial history of SCD^{4,17}

EXEMPTIONS

Indications for ICD with an Appropriate Pacing Modality in Special Situations

(6.7.12)4, 18 *

NOTE: With these ICD indications, CRT would sometimes be the appropriate pacing modality. CRT is likely to be the appropriate modality with anticipated requirement for significant (> 40%) ventricular pacing

- ICD criteria met, and elevated troponin is deemed not due to a myocardial infarction⁴
- ICD criteria met, except for myocardial infarction within 40 days or revascularization within 3 months, but a non-elective permanent pacemaker (new or replacement) is required, and recovery of left ventricular function to LVEF > 35% is uncertain or not expected^{*4 **}

- ICD criteria met, except NICM or ischemic cardiomyopathy has not had 3 months' time for LVEF to improve on medical therapy, a non-elective permanent pacemaker is required, and recovery of LVEF is uncertain or not expected^{***}
- Patient met primary prevention criteria for an ICD prior to coronary revascularization, and it is unlikely that LVEF will recover to > 35% despite a 90-day wait⁴⁸

*** With these ICD indications, CRT would sometimes be the appropriate pacing modality. CRT is likely to be the appropriate modality with anticipated requirement for significant (> 40%) ventricular pacing**

*****_These indications avoid a second implantation procedure within less than 3 months**

Coding and Standards

Coding

CPT Codes

33230, 33240, 33249

Applicable Lines of Business

<input checked="" type="checkbox"/>	<u>CHIP (Children's Health Insurance Program)</u>
<input checked="" type="checkbox"/>	<u>Commercial</u>
<input checked="" type="checkbox"/>	<u>Exchange/Marketplace</u>
<input checked="" type="checkbox"/>	<u>Medicaid</u>
<input type="checkbox"/>	<u>Medicare Advantage</u>

Background

Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines, and state/national recommendations.

BACKGROUND¹⁻⁷

The implantable cardioverter defibrillator (ICD) has become valuable in the management of patients with ventricular arrhythmias (VA) capable of causing syncope, cardiac arrest, and sudden cardiac death (SCD).

An ICD system includes a pulse generator and one or more leads. ICDs are indicated

both for patients who have survived life threatening rhythm disturbances (secondary prevention) and for those who are at risk for them (primary prevention).

Patient eligibility for an ICD presumes all the following:

- Anticipated reasonable quality of life for \geq 1-year post implantation¹²
- Patient's ability to live with a shock-delivering device that requires management
- Absence of a completely reversible cause that led to VA for which an ICD is being considered
- Completion of \geq 3 months of guideline-directed medical therapy (GDMT) for heart failure (HF), unless an intervening indication for pacemaker implantation arises (see Overview Information section for definition of GDMT)
- ICD indications are present in most scenarios in which cardiac resynchronization therapy (CRT) is appropriate
- Sustained VT is defined as having duration $>$ 30 seconds or requiring termination due to hemodynamic compromise in $<$ 30 seconds

Guidelines for the pediatric population are extrapolated from the adult population due to a lack of relevant trials.^{5,14}

OVERVIEW

~~General~~General¹⁻⁷

~~Implantable cardioverter defibrillators (ICDs) are indicated for the treatment of life-threatening ventricular tachycardia and ventricular fibrillation. An ICD system includes a pulse generator and one or more leads. ICDs are indicated both for patients who have survived life threatening rhythm disturbances (secondary prevention) and for those who are at risk for them (primary prevention).~~

- An ICD continually monitors heart rhythm. If a rapid rhythm is detected, the device delivers electrical therapy directly to the heart muscle to terminate the rapid rhythm and restore a normal heart rhythm. There are two types of therapy that can be delivered:
 - Rapid pacing OR
 - High-voltage shocks are necessary for ventricular fibrillation and when rapid pacing has failed to correct the abnormal rhythm
- In addition, all ICDs have pacing capability, and deliver pacing therapy for slow heart rhythms (bradycardia)
- The parameters defining limits for pacing therapy and for tachycardia therapy are programmable using noninvasive radio signals on all available ICDs

NYHA Class Definitions (7,13)

NYHA Class Definitions^{4, 19, 20}

- **Class I:** No limitation of functional activity or only at levels of exertion that would limit normal individuals. Ordinary physical activity does not cause symptoms of HF
- **Class II:** Slight limitation of activity. Fatigue, palpitation, or dyspnea with moderate exercise Comfortable at rest but ordinary physical activity results in symptoms of HF
- **Class III:** Marked limitation of activity. Fatigue, palpitation, or dyspnea with minimal activity Comfortable at rest but less than ordinary activity causes symptoms of HF
- **Class IV:** Severe limitation Unable to continue any physical activity without symptoms of activity. Symptoms even HF, or symptoms of HF at rest, worse with activity
- **Ambulatory Class IV:** Class IV heart failure with 1) no active acute coronary syndrome; 2) no inotropes; and 3) on GDMT

Guideline-Directed (or Optimal) Medical Therapy ~~infer~~ **Heart Failure** (14)7

- Angiotensin converting enzyme inhibitor (ACE-I), angiotensin receptor blockers (ARB), or combined angiotensin receptor inhibitor and neprilysin inhibitor (ARNI)
- Beta blockers

Other Options/Considerations for GDMT

- Addition of loop diuretic for all NYHA class II – IV patients
- Addition of hydralazine and nitrate for persistently symptomatic African Americans, NYHA class III-IV
- Addition of an aldosterone antagonist, provided eGFR is ≥ 30 ml/min/1.73m² and K⁺ < 5.0, NYHA class II-IV^m
- Normal serum sodium and potassium
- Not required for consideration of ICD: Ivabradine for NYHA class II – III, when a beta blocker has failed to reduce a sinus rate to < 70 bpm. Ivabradine listed as a class IIa recommendation, while others are class I recommendations. CRT trials antedated routine use of Ivabradine.

Acronyms / Abbreviations

ACE-I	: Angiotensin converting enzyme inhibitor
ARNI	: Combined angiotensin receptor inhibitor and neprilysin inhibitor
ARVD/C	: Arrhythmogenic right ventricular dysplasia/cardiomyopathy
AV	: Atrioventricular
CAD	: Coronary artery disease, same as ischemic heart disease
CHD	: Congenital heart disease
CHF	: Congestive heart failure
CRT	: Cardiac resynchronization therapy
CRT-D	: Cardiac resynchronization therapy ICD system
DCM	: Dilated cardiomyopathy
ECG	: Electrocardiogram
EF	: Ejection fraction
EPS	: Electrophysiologic Study
GDMT	: Guideline-Directed Medical Therapy
HCM	: Hypertrophic cardiomyopathy
HF	: Heart failure
HV	: His-ventricle
ICD	: Implantable cardioverter-defibrillator
LBBB	: Left bundle-branch block
LV	: Left ventricular/left ventricle
LVAD	: Left ventricular assist device, mechanical heart
LVEF	: Left ventricular ejection fraction
LVH	: Left ventricular hypertrophy
MI	: Myocardial infarction
ms	: Milliseconds
NICM	: Nonischemic cardiomyopathy
NSVT	: Nonsustained ventricular tachycardia
NYHA	: New York Heart Association
PET	: Positron emission tomography
PVC	: Premature Ventricular Contraction
RV	: Right ventricular/right ventricle
RVEF	: Right ventricular ejection fraction
SCD	: Sudden Cardiac Death
STEMI	: ST-elevation myocardial infarction
SND	: Sinus node dysfunction
VT	: Ventricular tachycardia
VF	: Ventricular fibrillation

Policy History

Summary

Date	Summary
<u>February 2024</u>	<u>Added AUC Scoring to Cardiac Guidelines from published Societies. When an AUC score was not published by a Society, we assigned an AUC score of 6 based upon AUC scoring standards – this has been explained in Clinical Reasoning</u>
<u>April 2023</u>	<u>Added nonischemic CM indication for EF ≤ 35% and removed statement about requirement of 90-day post revascularization Added statement on clinical indications not addressed in this guideline</u>
February 2022	Removed statement about hypertrophic cardiomyopathy being reasonable with family history of SCD
March 2021	<p>Added section to clarify indications for unexplained syncope Revised and added reference for hypertrophic cardiomyopathy to include: Indication for EF < 50% Added statement on consideration for ICD in children Statement on placement of ICD in competitive athletics Addition: All indications are predicated on an expected life expectancy of greater than one year if the ICD is implanted. Reorganization: Ischemic Heart Disease (CAD) sections Addition : indications under ischemic heart disease for NSVT due to prior MI, LVEF ≤ 40%, and inducible VT or VF at EPS Revision: HCM section as per new HOCM guidelines J Am Coll Cardiol. 2020 Dec, 76 (25) 3022–3055 Addition: Neuromuscular Disorders section, various included types, expanded criteria Deletion: Channelopathies section, deleted types from High-Risk Genotype Addition: Brugada syndrome, broadened definition to “Syncope presumed to be due to ventricular arrhythmia” Addition: added “J-wave Syndrome” to Early Repolarization section Changes to Adult & Pediatric Congenital Heart Disease (CHD) section: Addition: added “Cardiac arrest due to VF or VT, or unstable VT, after exclusion of a reversible etiology” to Adult & Pediatric Congenital Heart Disease (CHD) section</p>

	<p>-Revision: Tetralogy of Fallot, changed to “Residual pulmonary regurgitation or stenosis”</p> <p>-Addition: Tetralogy of Fallot, added RV Hypertension</p> <p>Revision: “Syncope of unknown origin in the presence of either at least moderate ventricular dysfunction or marked hypertrophy or inducible sustained VT or VF”</p> <p>Revision: “Syncope and moderate or severe complexity CHD, with high clinical suspicion of ventricular arrhythmias”</p>
March 2020	<p>Added general information section as Introduction which outlines requirements for documentation of pertinent office notes by a licensed clinician, and inclusion of laboratory testing and relevant imaging results for case review</p> <p>Removed the statement regarding waiting period from the Overview section</p> <p>Updated and added new references</p>
August 2019	<p>Removed indications under ischemic heart disease for NSVT due to prior MI, LVEF \leq 40%, and inducible VT or VF at EPS</p> <p>Removed indications under ischemic heart disease for VT or VF $<$ 48 hours post MI or elective coronary revascularization</p> <p>Under NICM, removed indication for peripartum cardiomyopathy with LVEF \leq 35% that persists $>$ 3 months</p> <p>Under advanced heart failure and transplantation, removed indication for severe allograft vasculopathy</p> <p>Revision to cardiac sarcoidosis indication to add cardiac arrest</p> <p>Under hypertrophic cardiomyopathy revised indications for documented NSVT to include an additional SCD risk modifier (age $<$ 30-yr, delayed hyperenhancement on cardiac MRI, LVOT obstruction, or syncope $>$ 5 yr ago) or high risk feature (LV aneurysm or LVEF $<$ 50%)</p> <p>Removed indications for giant cell myocarditis and chronic Chagas cardiomyopathy</p> <p>Removed indication for hypertensive heart disease with LVH and LVEF \leq 35%</p> <p>Under Tetralogy of Fallot added the following indications:</p> <p>Prior palliative systemic to pulmonary shunts</p> <p>Unexplained syncope</p> <p>Frequent PVCs</p> <p>Atrial tachycardia</p> <p>Left ventricular diastolic dysfunction</p> <p>Dilated right ventricle</p>

ADDITIONAL RESOURCES

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LEGAL AND COMPLIANCE

Guideline Approval

Reviewed / Approved by **NIA Evolent Specialty Clinical Guideline Review Committee**

Disclaimer: National Imaging Associates, Inc. (NIA) authorization policies

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