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جمعية القلب السعودية
Saudi Heart Association

Syncope Guidelines Update

Bernard Harbieh, FHRS

AUBMC-KMC

Beirut-Lebanon



New Syncope Guidelines

- Increase the volume of information on diagnosis and management
- Incorporation of emergency specialists, neurologists, and geriatricians into the working group



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- 69 pages and 440 references vs the 41 pages and 213 references of the previous guidelines
- Practical Instructions: 38 pages and 192 references
- The number of recommendations has increased by 7%; however, 40% are level I (49% in 2009) and only 3% are level III (14% in 2009). Neither has the level of evidence changed substantially: only 5% of recommendations are level A (3% in 2009) and most—50%—are level C (52% in 2009).



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- The role of syncope units (SUs) is emphasized in a commitment to improved patient-focused safety and efficiency. This same commitment is reflected in the definition of the initial evaluation and risk stratification in the emergency department.



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CHANGE IN RECOMMENDATIONS		CHANGE IN RECOMMENDATIONS	
2009	2018	2009	2018
Contraindications to CSM		Syncope & AF: catheter ablation Expert opinion	
Tilt testing: indication for syncope ^{23, 24, 105-109, 111-117}		ICD: LVEF >35% and syncope ⁴⁶	
Tilt testing for educational purposes ¹¹⁹⁻¹²¹		Syncope & high risk HCM: ICD ²⁴⁵	
Tilt testing: diagnostic criteria ^{23, 24, 105-109, 111-117}		Syncope & ARVC: ICD ⁴⁶	
Tilt testing for assessing therapy		Psychiatric consultation for PPS Expert opinion	
Holter for unexplained syncope ¹⁶¹			
ECG monitoring: presyncope & asymptomatic arrhythmias			
Adenosine triphosphate test			
EPS-guided pacemaker: prolonged SNRT ²¹⁰⁻²¹²			
EPS-guided pacemaker: HV >70 ms ^{188, 214-217, 221}			
Empiric pacing in bifascicular block ^{217, 255, 344}			
Therapy of reflex syncope: PCM ^{119-121, 263, 264}			
Therapy of OH: PCM ³¹⁹			
Therapy of OH: abdominal binders ^{23, 320, 321}			
Therapy of OH: head-up tilt sleeping ^{104, 322, 323}			
Syncope & SVT/VT: AA drugs Expert opinion			

2018 NEW RECOMMENDATIONS (only major included)	
Management of syncope in ED (section 4.1.2)	
<ul style="list-style-type: none"> • <i>Low-risk</i>: discharge from ED • <i>High-risk</i>: early intensive evaluation in ED, SU versus admission • <i>Neither high or low</i>: observation in ED or in SU instead of being hospitalized 	
Video recording (section 4.2.5):	
• Video recordings of spontaneous events	
ILR indications (section 4.2.4.7):	
• In patients with suspected unproven epilepsy	
• In patients with unexplained falls	
ILR indications (section 5.6):	
• In patients with primary cardiomyopathy or inheritable arrhythmogenic disorders who are at low risk of sudden cardiac death, as alternative to ICD	

I	IIa	IIb	III	Taken out
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From: 2018 ESC Guidelines for the diagnosis and management of syncope

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Management of syncope in the emergency department according to risk stratification

- One of the most novel aspects of the guidelines
- To reduce the hospital admission rate without compromising patient safety.
- Low and high-risk factors can be obtained from the clinical history, physical examination, and electrocardiogram.



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- High-risk patients are more likely to have cardiac syncope and, therefore, have a higher risk of sudden death than low-risk patients who, in contrast, are more likely to have reflex syncope and good prognosis



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Class I B

- Low-risk patients without recurrence can be discharged from emergency departments
- High-risk patients: admitted or exhaustively evaluated in emergency departments or SUs
- Patients without high- or low-risk criteria: studied in emergency department observation units or referred to SUs instead of being admitted



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- A novelty is the equal consideration of presyncope and syncope, introduced because evidence indicates that they have the same prognosis



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Carotid sinus massage

- Because it is one of the most cost-effective tests, CSM can be performed in the initial evaluation of patients older than 40 years.
- There are no changes in the level of indication or in the positive diagnostic criteria (presence of syncope together with ventricular pause > 3 seconds or a systolic blood pressure fall > 50 mmHg).
- **The guidelines no longer deem the test contraindicated in patients with stroke in the previous 3 months or with carotid murmurs**



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Orthostatic challenge

- Its level of indication has fallen from I B to I C but the classic diagnostic criteria are maintained (I C if syncope occurs during the test and IIa C if there is a significant fall in blood pressure but no syncope).
- The initial orthostatic intolerance (that occurring < 30 seconds after the orthostatism) cannot be diagnosed with a sphygmomanometer and a “beat-to-beat” measurement is necessary (IIb C indication).



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Tilt-table

- Recommendation drops from I B to IIa B
- The diagnostic criteria indication falls from I to IIa.
- In addition, its lack of ability to direct management is maintained.
- The TT is now considered useful for assessing “hypotensive tendency”. Its usefulness is clear in the context of orthostatic intolerance (either POTS or neurogenic hypotension)
- However, its applications are numerous: vasodepressor component assessment, differential diagnosis (epilepsy, psychiatric syncope), ventricular pause evaluation, prodrome recognition training, research, or videoelectroencephalography.



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Electrocardiographic monitoring

1. *In-hospital monitoring.* Immediate monitoring is recommended in high-risk patients (I C), without changes.
 - A clear recommendation for monitoring time is missing, and the lack of evidence is notable.
 - A 6-hour emergency department time and a 24-hour hospitalization time are recommended in high-risk patients, without scientific support.



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2. *Holter monitoring, event recorders, smartphone applications, and external loop recorders.* There are no major changes. Smartphone applications, although innovative, are undermined by their need to be activated by patients before the syncope.
- In the case of external loop recorders, the guidelines again apply a class IIa B recommendation for patients with an intersymptom interval less than 4 weeks



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3. *Implantable loop recording.* The recommendations remain class I, but with a higher level of evidence, for patients “not at high risk” with recurrent syncope of uncertain origin and a high probability of recurrence during the battery life of the device and for high-risk patients after an exhaustive and unsuccessful investigation



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Two new recommendations with clinical implications for ILRs

- Patients with unexplained falls (esp Elderly) and patients with suspected epilepsy whose treatment is ineffective
- A novelty is the mention of the possibility of remote monitoring, which improves the diagnostic performance by shortening the detection time



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4. *Diagnostic criteria of implantable loop recording findings.*

- The number of recommendations decreases to 2: the findings are diagnostic when there is a correlation between syncope and arrhythmia and when, in the absence of syncope during the recording, prolonged pauses are observed, as well as third-degree or Mobitz II atrioventricular block or rapid tachycardia.
- It is presented as advice, and not as a recommendation, that the absence of arrhythmia during syncope rules out arrhythmic syncope and that the presence of significant arrhythmia during presyncope can be considered a diagnostic finding



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5. *Video recording*

- This technique appears as a recommendation for the first time, in 2 situations.
- In the first case, for syncope occurring at home
- The second situation is the use of video recording during the TT test to improve the clinical observation of the events induced.
- Although class IIb, this recommendation is better documented and more feasible



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6. *Electrophysiological study.*

- Its use would be restricted to 2% to 3% of syncope of uncertain origin. Its limitations include the low negative predictive value and the nonspecificity of the induction of polymorphous ventricular tachycardia or ventricular fibrillation in most structural heart diseases.
- It continues to be useful in specific situations such as:
- *Asymptomatic sinus bradycardia* (CSNRT > 525 ms: PM IIa B)
- *Bifascicular block* (IIa B, unchanged)
- *Suspected tachycardia*
- In syncope preceded by palpitations: a IIb C indication



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Endogenous adenosine and other biomarkers

1. Adenosine test.

- The guidelines newly introduce adenosine-sensitive syncope, a type of asystolic syncope seen in patients without prodromes and heart disease and with normal baseline ECG that could be due to endogenous adenosine release.



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2. *Cardiovascular and immunological biomarkers.*

- The possible future usefulness of biomarkers and autoantibodies for autonomic dysfunction is mentioned, although the authors stress the need for more evidence



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Treatment of Reflex Syncope

- The recommendation level of the indication for isometric physical counterpressure maneuvers is reduced (from I B to IIa B).
- This reduction is due to its low usefulness in the ISSUE-3 trial in elderly patients without prolonged and recognizable prodromes



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Treatment of Orthostatic Hypotension and Orthostatic Intolerance Syndromes

- Years have passed but the treatment remains the same and as weakly effective as ever. Only water and salt intake has a class I C indication. There is little evidence of its effectiveness: in the American guidelines, the recommendation is IIb
- only midodrine and fludrocortisone have a IIa indication



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Treatment of Syncope Due to Arrhythmias

1. *Syncope due to intrinsic sinoatrial or atrioventricular conduction system disease*
 - The indications for PM implantation **have not been substantially modified.**
 - Two aspects are detailed: *a)* in patients with sinus node disease without documentation of symptomatic pauses, the recommendation is to rule out other diagnostic alternatives (particularly reflex syncope) before PM implantation in order to reduce the high rate of syncopal recurrences, which is as high as 28% in some series; and *b)* in patients with syncope and bifascicular block on ECG, in order to establish the PM indication, the recommendation is to document the pathological findings in an electrophysiological study or via a significant pause on an implantable loop recorder



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2. *Syncope due to tachyarrhythmias*. Catheter ablation is the treatment of choice

Two notes are made:

- a) to individualize the therapeutic option (ablation or drugs) for atrial fibrillation and left atrial flutter (medical therapy was prioritized in previous guidelines);
- b) to consider implantable cardioverter-defibrillator (ICD) placement after documentation of ventricular arrhythmias in order to reduce mortality in individuals with a left ventricular ejection fraction (LVEF) $\leq 35\%$ (I A) or with previous infarction and induction of tachycardia ventricular (I C).



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3. *Treatment of unexplained syncope in patients at high risk of sudden cardiac death.*

There are 2 options:

- a) ICD therapy, given that, in this environment, syncope significantly increases the risk of sudden cardiac death;
- b) completion of the etiological study (with the intention of documenting the clinical arrhythmia) via placement of an implantable loop recorder in low-risk individuals without an indication for ICD



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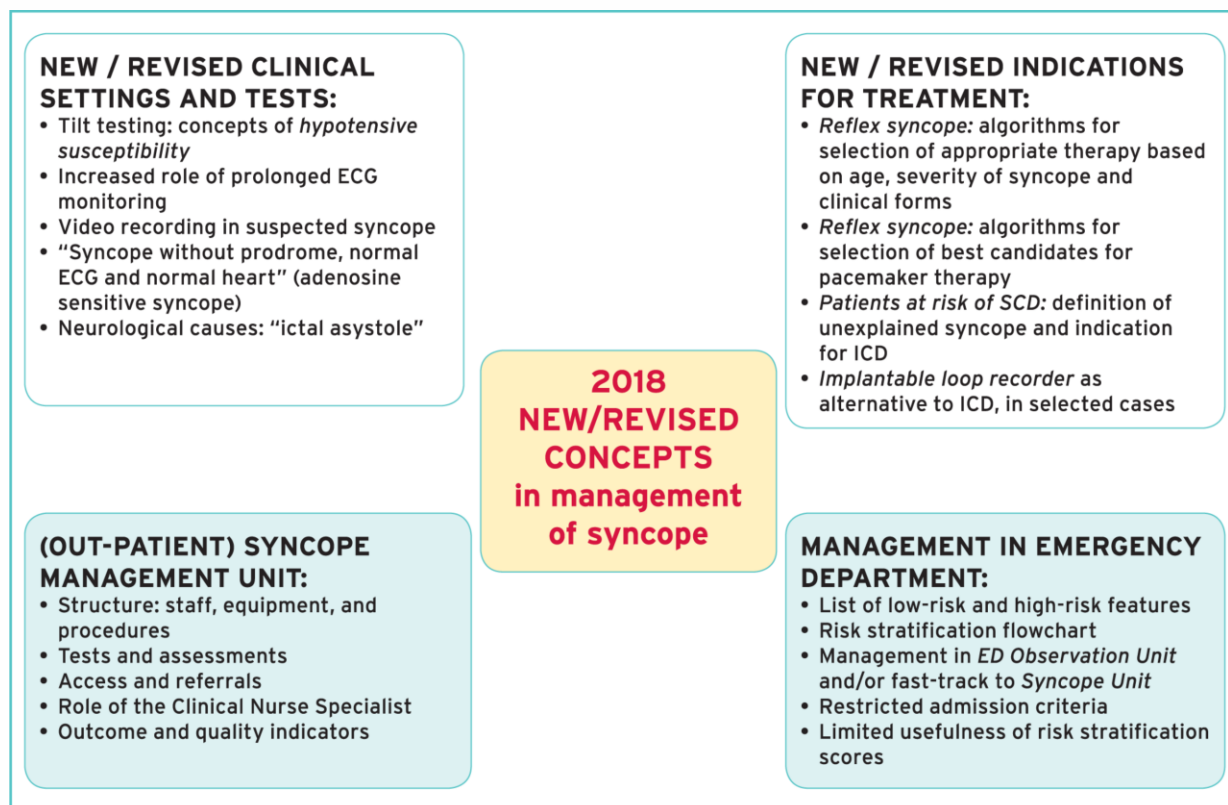
NEUROLOGICAL CAUSES AND “PSEUDOSYNCOPE

- Electroencephalography, Doppler imaging of the supraaortic trunks, and brain computed tomography or magnetic resonance imaging (MRI) are not indicated for syncope (class III B recommendation).
- However, importantly, in contrast to the previous guidelines, brain MRI (I C) is recommended in patients with signs of parkinsonism, ataxia, or cognitive impairment.
- Electroencephalography is only useful in doubtful cases or to establish the diagnosis of psychogenic syncope if an induced episode is recorded.
- A novelty is the recommendation (I B) for paraneoplastic antibody screening (and active searching for occult neoplasia if positive) and antiganglionic acetylcholine receptor antibodies in patients with acute or subacute onset of autonomic dysfunction



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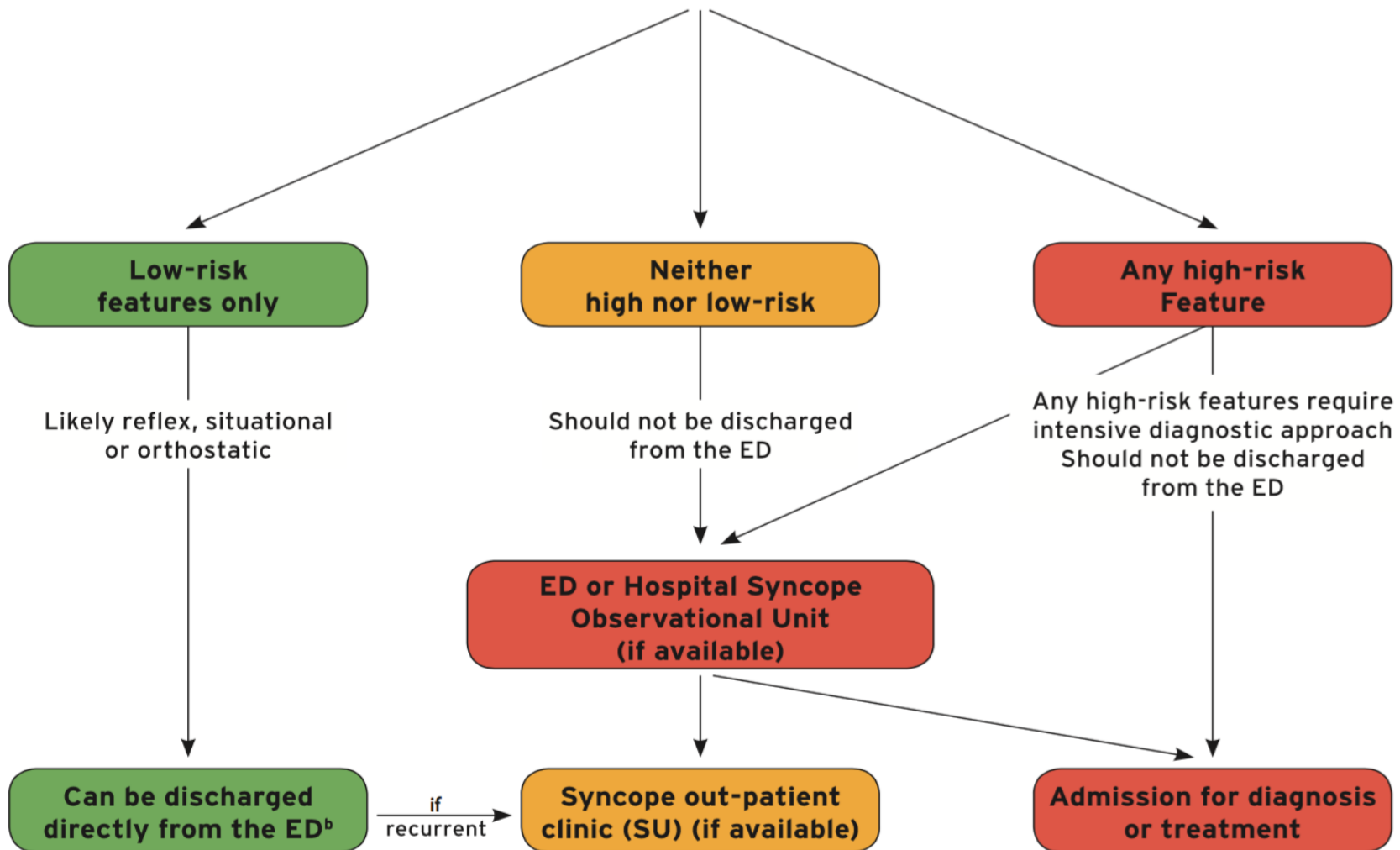
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Syncope^a
(after initial evaluation in ED)



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SYNCOPE EVENT

Low-risk

- Associated with prodrome typical of reflex syncope (e.g. light-headedness, feeling of warmth, sweating, nausea, vomiting)^{36,49}
- After sudden unexpected unpleasant sight, sound, smell, or pain^{36,49,50}
- After prolonged standing or crowded, hot places³⁶
- During a meal or postprandial⁵¹
- Triggered by cough, defaecation, or micturition⁵²
- With head rotation or pressure on carotid sinus (e.g. tumour, shaving, tight collars)⁵³
- Standing from supine/sitting position⁵⁴

High-risk

Major

- New onset of chest discomfort, breathlessness, abdominal pain, or headache^{26, 44, 55}
- Syncope during exertion or when supine³⁶
- Sudden onset palpitation immediately followed by syncope³⁶

Minor (high-risk only if associated with structural heart disease or abnormal ECG):

- No warning symptoms or short (<10 s) prodrome^{36, 38, 49, 56}
- Family history of SCD at young age⁵⁷
- Syncope in the sitting position⁵⁴



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PHYSICAL EXAMINATION

Low-risk

- Normal examination

PHYSICAL EXAMINATION

High-risk

Major

- Unexplained systolic BP in the ED <90 mmHg^{26, 55}
- Suggestion of gastrointestinal bleed on rectal examination⁴⁴
- Persistent bradycardia (<40 b.p.m.) in awake state and in absence of physical training
- Undiagnosed systolic murmur⁶⁰



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PAST MEDICAL HISTORY

Low-risk

- Long history (years) of recurrent syncope with low-risk features with the same characteristics of the current episode⁵⁸
- Absence of structural heart disease^{27, 58}

High-risk

Major

- Severe structural or coronary artery disease (heart failure, low LVEF or previous myocardial infarction)^{26, 27, 35, 55, 59}



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ECG^a**Low-risk**

- Normal ECG^{26, 35, 36, 55}

High-risk**Major**

- ECG changes consistent with acute ischaemia
- Mobitz II second- and third-degree AV block
- Slow AF (<40 b.p.m.)
- Persistent sinus bradycardia (<40 b.p.m.), or repetitive sinoatrial block or sinus pauses >3 seconds in awake state and in absence of physical training
- Bundle branch block, intraventricular conduction disturbance, ventricular hypertrophy, or Q waves consistent with ischaemic heart disease or cardiomyopathy^{44, 56}
- Sustained and non-sustained VT
- Dysfunction of an implantable cardiac device (pacemaker or ICD)
- Type 1 Brugada pattern
- ST-segment elevation with type 1 morphology in leads V1-V3 (Brugada pattern)
- QTc >460 ms in repeated 12-lead ECGs indicating LQTS⁴⁶

Minor (high-risk only if history consistent with arrhythmic syncope)

- Mobitz I second-degree AV block and 1°degree AV block with markedly prolonged PR interval
- Asymptomatic inappropriate mild sinus bradycardia (40-50 b.p.m.), or slow AF (40-50 b.p.m.)⁵⁶
- Paroxysmal SVT or atrial fibrillation⁵⁰
- Pre-excited QRS complex
- Short QTc interval (≤ 340 ms)⁴⁶
- Atypical Brugada patterns⁴⁶
- Negative T waves in right precordial leads, epsilon waves suggestive of ARVC⁴⁶



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Tilt testing

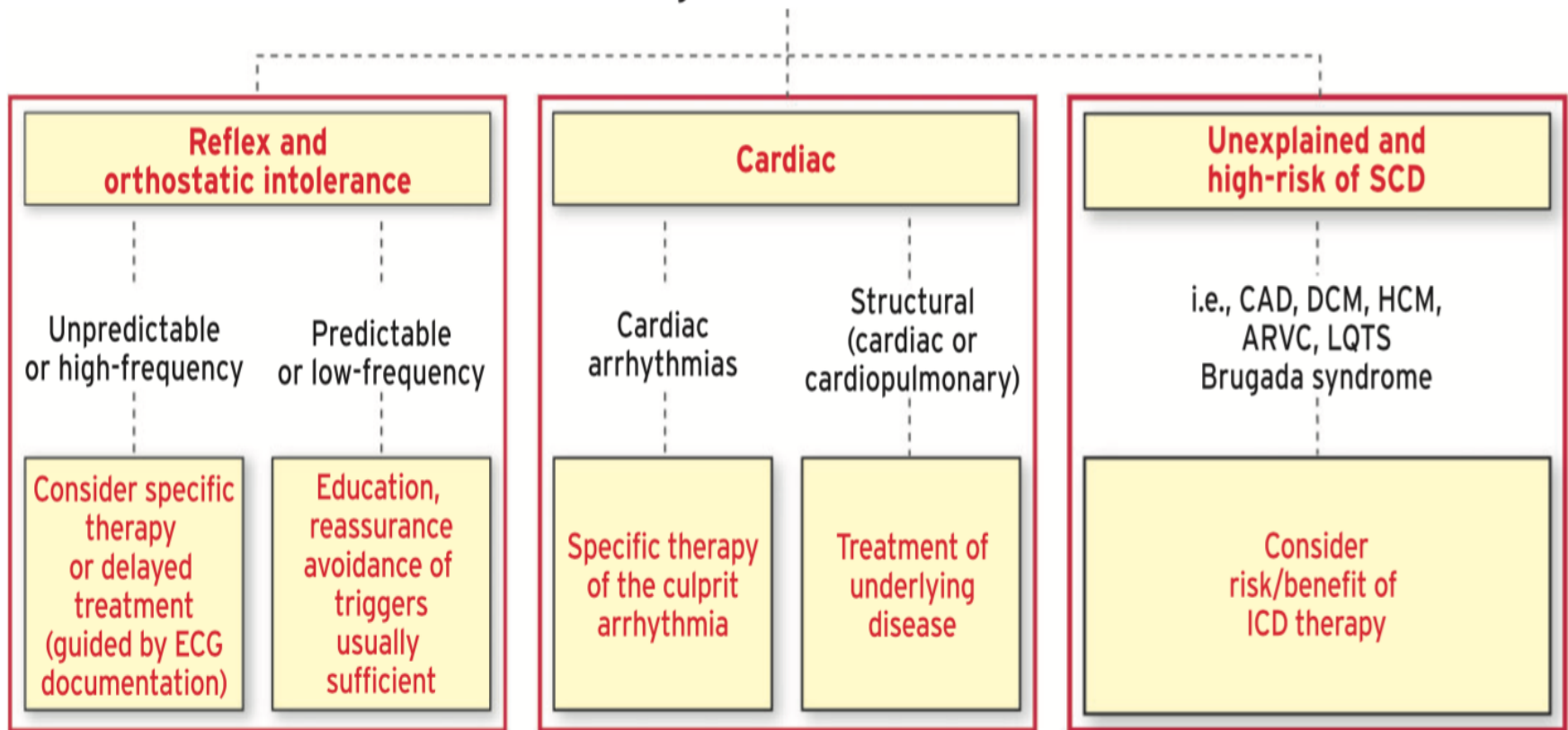
Recommendations	Class ^a	Level ^b
Indications		
Tilt testing should be considered in patients with suspected reflex syncope, OH, POTS, or PPS. ^{23,24,105–109,111–117}	Ila	B
Tilt testing may be considered to educate patients to recognize symptoms and learn physical manoeuvres. ^{119–121}	Ilb	B
Diagnostic criteria		
Reflex syncope, OH, POTS, or PPS should be considered likely if tilt testing reproduces symptoms along with the characteristic circulatory pattern of these conditions. ^{23,24,105–109,111–117}	Ila	B
Additional advice and clinical perspectives <ul style="list-style-type: none"> • A negative tilt table response does not exclude a diagnosis of reflex syncope. • While sensitivity and specificity are at acceptable levels when measured in patients with VVS and healthy controls, in usual clinical settings of syncope of uncertain origin tilt testing suggests the presence of a <i>hypotensive susceptibility</i>, which may exist not only in reflex syncope but also with other causes of syncope including some forms of cardiac syncope. The concept of hypotensive susceptibility rather than diagnosis has important practical utility, because the presence or absence of hypotensive susceptibility plays a major role in guiding pacemaker therapy in patients affected by reflex syncope and in the management of hypotensive therapies, which are frequently present in the elderly with syncope (see sections 5.1 and 5.2). • A positive cardioinhibitory response to tilt testing predicts, with high probability, asystolic spontaneous syncope; this finding is relevant for therapeutic implications when cardiac pacing is considered (see section 5.2.6). Conversely, the presence of a positive vasodepressor, a mixed response, or even a negative response does not exclude the presence of asystole during spontaneous syncope.^{122,123} • Tilt testing may be helpful in separating syncope with abnormal movements from epilepsy.¹³⁷ • Tilt testing may have value in distinguishing syncope from falls.²³ • Tilt testing may be helpful in separating syncope from PPS. In suspected PPS, the tilt test should preferably be performed together with EEG monitoring; a normal EEG helps to confirm the diagnosis.^{116,117} In the absence of an EEG, a video recording will be helpful in confirming the diagnosis. • Tilt testing should not be used to assess the efficacy of a drug treatment.¹¹⁸ 		

EEG = electroencephalogram; OH = orthostatic hypotension; POTS = postural orthostatic tachycardia syndrome; PPS = psychogenic pseudosyncope; VVS = vasovagal syncope.



Treatment of syncope

Diagnostic evaluation



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The following are key points to remember from the 2018 European Society of Cardiology (ESC) Guidelines for the Diagnosis and Management of Syncope



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- Syncope is defined as transient loss of consciousness (TLOC) due to cerebral hypoperfusion, characterized by a rapid onset, short duration, and spontaneous complete recovery



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- At the time of initial evaluation, clinicians should answer the following key questions:
 - Was the event TLOC?
 - In cases of TLOC, are they of syncopal or nonsyncopal origin?
 - In cases of suspected syncope, is there a clear etiological diagnosis?
 - Is there evidence to suggest a high risk of cardiovascular events or death?
 - Is there a serious underlying cause that can be identified?
 - If the cause is uncertain, what is the risk of a serious outcome?
 - Should the patient be admitted to the hospital?



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- All patients should undergo a complete history, physical examination (including standing blood pressure measurement), and standard electrocardiogram (ECG). ECG monitoring (in bed or telemetry) should be performed in high-risk patients when there is a suspicion of arrhythmic syncope



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- An echocardiogram should be performed when there is previous known heart disease, or data suggestive of structural heart disease or syncope secondary to cardiovascular cause.
- Carotid sinus massage should be performed in patients >40 years of age with syncope of unknown origin compatible with a reflex mechanism.
- In addition, tilt testing should be performed in cases where there is suspicion of syncope due to reflex or an orthostatic cause



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- Prolonged ECG monitoring (external or implantable) should be performed in patients with recurrent severe unexplained syncope who have all of the following three features:
 - Clinical or ECG features suggesting arrhythmic syncope.
 - A high probability of recurrence of syncope in a reasonable time.
 - Who may benefit from a specific therapy if a cause for syncope is found



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- Electrophysiological study should be performed in patients with unexplained syncope and bifascicular bundle branch block (impending high-degree atrioventricular [AV] block) or suspected tachycardia
- An exercise stress test performed in patients who experience syncope during or shortly after exertion



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- All patients with reflex syncope and orthostatic hypotension should have the diagnosis explained, reassured, explained the risk of recurrence, and given advice on how to avoid triggers and situations.
- These measures are the cornerstone of treatment and have a high impact in reducing the recurrence of syncope



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- In patients with severe forms of reflex syncope, one or more of the following additional specific treatments according to the clinical features may be selected:
 - Midodrine or fludrocortisone in young patients with low blood pressure phenotype.
 - Counter-pressure maneuvers (including tilt training if needed) in young patients with prodromes.
 - Implantable loop recorder guided management strategy in selected patients without or with short prodromes.
 - Discontinuation/reduction of hypotensive therapy targeting a systolic blood pressure of 140 mm Hg in older hypertensive patients.
 - Pacemaker implantation in older patients with dominant cardioinhibitory forms.



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- In patients with orthostatic hypotension, one or more of the following additional specific treatments may be selected according to clinical severity:
 - Education regarding lifestyle maneuvers.
 - Adequate hydration and salt intake.
 - Discontinuation/reduction of hypotensive therapy.
 - Counter-pressure maneuvers.
 - Abdominal binders and/or support stockings.
 - Head-up tilt sleeping.
 - Midodrine or fludrocortisone



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- The diagnostic process should be reevaluated and alternative therapies considered if the above rules fail or are not applicable to an individual patient.
- Even though guidelines are based on the best available scientific evidence, treatment should always be tailored to an individual patient's need and be patient centered



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- The following are key points to remember from the Practical Instructions for the 2018 European Society of Cardiology (ESC) Guidelines for the Diagnosis and Management of Syncope



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- Reflex syncope is the most frequent cause of syncope in any setting and at all ages, with cardiac syncope as the second most common cause



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- Transient loss of consciousness is characterized by four specific characteristics: short duration, abnormal motor control, loss of responsiveness, and amnesia for the period of loss of consciousness



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- Carotid sinus massage (CSM) preferably is performed during continuous electrocardiogram (ECG) and noninvasive beat-to-beat blood pressure (BP) monitoring.
- Carotid sinus hypersensitivity is diagnosed when CSM elicits abnormal cardioinhibition (i.e., asystole ≥ 3 seconds) and/or vasodepression (i.e., a fall in systolic BP > 50 mm Hg)



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- It is recommended that the following method be adopted for tilt testing:
 - Patients should be fasted for 2–4 hours before the test.
 - Ensure a supine pre-tilt phase of ≥ 5 minutes when there is no venous cannulation, and of ≥ 20 minutes when there is venous cannulation.
 - Tilt angle between 60 and 70 degrees.
 - Passive phase of tilt of ≥ 20 minutes in duration and a maximum of 45 minutes.
 - Use either sublingual nitroglycerin or intravenous isoproterenol for drug provocation if the passive phase is negative. The duration of the drug-challenge phase is 15–20 minutes.
 - For nitroglycerin challenge, a fixed dose of 300–400 μg sublingually administered with the patient in the upright position.
 - For isoproterenol challenge, an incremental infusion rate from 1 $\mu\text{g}/\text{min}$ rising to 3 $\mu\text{g}/\text{min}$ to increase average heart rate by about 20–25% over baseline.
 - The test should be continued until complete loss of consciousness occurs or completion of the protocol.
 - Tilt tables have only one specific requirement: the tilt-down time should be short (< 15 seconds), as longer times increase the duration of precipitated asystole



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- Autonomic function testing should be performed by a specialist trained in autonomic function testing and interpretation. The required equipment includes beat-to-beat BP and ECG monitoring, a motorized tilt table, 24-hour ambulatory BP monitoring devices, and other specialized equipment depending on the range of testing



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- During the Valsalva maneuver, the patient is asked to conduct a maximally forced expiration for 15 seconds against a closed glottis, i.e., with closed nose and mouth, or into a closed loop system with a resistance of 40 mm Hg. The hemodynamic changes during the test should be monitored using beat-to-beat continuous noninvasive BP measurement and ECG



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- During the deep-breathing test, the patient is asked to breathe deeply at 6 breaths per minute for 1 minute under continuous heart rate and BP monitoring.
- In healthy individuals, heart rate rises during inspiration and falls during expiration



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- Classical orthostatic hypotension is defined as a sustained decrease in systolic BP ≥ 20 mm Hg, diastolic BP ≥ 10 mm Hg, or a sustained decrease in systolic BP to an absolute value < 90 mm Hg within 3 minutes of active standing or head-up tilt of at least 60 degrees



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- Postural orthostatic tachycardia syndrome patients, mostly young women, present with severe orthostatic intolerance (light-headedness, palpitations, tremor, generalized weakness, blurred vision, and fatigue) and a marked orthostatic heart rate increase (>30 bpm, or >120 bpm) within 10 minutes of standing or head-up tilt in the absence of orthostatic hypotension



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- The BP fall of orthostatic vasovagal syncope differs from that in classical orthostatic hypotension.
- In vasovagal syncope, the BP drop starts several minutes after standing up and the rates of BP drop accelerate until people faint, lie down, or do both. Hence, low BP in orthostatic vasovagal syncope is short-lived.
- In classical orthostatic hypotension, the BP drop starts immediately on standing and the rate of drop decreases, so low BP may be sustained for many minutes



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- **Diagnostic Tests**

- There are no changes to diagnostic tests, but a change in “philosophy” is seen with the promotion of the study of dysautonomia as a possible cause of neuromediated syncope.
- A reasoned step is the incorporation of the neurologist's viewpoint and of neurological tests into the diagnosis and, although to a lesser extent, into the treatment



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POTS

- Postural orthostatic tachycardia syndrome (POTS) is precisely defined as an increase in heart rate of more than 30 beats or a rate exceeding 120 bpm with associated symptoms and without hypotension.
- The definition does not note that the increase should exceed 40 bpm in adolescents, as recommended by the consensus statement on orthostatic hypotension and POTS



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3. *Echocardiography.*

- Echocardiography is still indicated (I B) when there is a suspicion of structural heart disease.
- The indication for exercise stress echocardiography (I C) is introduced to detect an inducible obstruction in the left ventricular outflow tract in patients with hypertrophic cardiomyopathy and postural or exertional syncope with a gradient less than 50 mmHg at rest or after induction



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- *Cardiac pacing*
- Four possible indications are defined, the first 3 for patients older than 40 years: *a)* documentation of spontaneous bradyarrhythmia (IIa B); *b)* carotid sinus syndrome with cardioinhibitory mechanism (IIa B); *c)* asystole induced in the TT test (IIb B); and *d)* adenosine-sensitive syncope (IIb B).



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