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# Guidelines for the management of syncope

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**These guidelines are based predominantly on:**

ESC 2018 Guidelines for the diagnosis and management of syncope developed in collaboration with the Task Force for the diagnosis and management of syncope of the European Society of Cardiology (ESC), with the special contribution of the European Heart Rhythm Association (EHRA). European Heart Journal (2018); 00:1-69.

**These guidelines are a summary of the current guidelines and consensus documents of the ESC / EACVI and are intended for internal use within the SHSC only.**

### 1.1 Abbreviations:

ABPM	Ambulatory blood pressure monitoring
AF	Atrial fibrillation
ARVC	Arrhythmogenic right ventricular cardiomyopathy
AV	Atrioventricular
BBB	Bundle branch block
BP	Blood pressure
CRT-D	Cardiac resynchronization therapy defibrillator
CSM	Carotid sinus massage
CSS	Carotid sinus syndrome
DCM	Dilated cardiomyopathy
ECG	Electrocardiogram
ED	Emergency department
EPS	Electrophysiological study
EST	Exercise stress test
ESC	European society of cardiology
HBPM	Home blood pressure monitor
HCM	Hypertrophic cardiomyopathy
HR	Heart rate
ICD	Implantable cardiac defibrillator
ILR	Implantable loop recorder
LOC	Loss of consciousness
LQTS	Long QT syndrome
LVEF	Left ventricular ejection fraction
OH	Orthostatic hypotension
POTS	Postural orthostatic tachycardia syndrome
PPS	Psychogenic pseudosyncope
SCD	Sudden cardiac death
SVT	Supraventricular tachycardia
SNRT	Sinus node recovery time
TIA	Transient ischemic attack
TLOC	Transient loss of consciousness
VF	Ventricular fibrillation
VT	Ventricular tachycardia
VVS	Vasovagal syncope
SHSCT	Southern Health and Social Care Trust
DVLA	Driver and vehicle licensing agency

## 1.2 Key messages:

### **Diagnosis, initial evaluation and subsequent workup:**

- Perform a complete history taking, physical examination (including lying and standing BP measurements) and a 12 lead electrocardiogram (ECG).
- Was there transient loss of consciousness (TLOC)?
- Was the TLOC syncopal or non-syncopal in origin?
- In cases of suspected syncope, is there a clear aetiological diagnosis?
- Is there evidence to suggest a high risk of cardiovascular events or death?
- Should the patient be admitted?
- Continuous ECG monitoring (telemetry), if suspected cardiac syncope.
- Perform an echocardiogram when there is previous known heart disease, or data suggestive of structural heart disease or syncope secondary to cardiovascular cause.
- Perform carotid sinus massage (CSM) in patients >40 years of age with syncope of unknown origin compatible with a reflex mechanism.
- Perform tilt testing in cases where there is suspicion of syncope due to reflex or an orthostatic cause.
- Oxygen saturation and blood gas analysis when hypoxic syndromes are suspected, troponin when cardiac ischaemia-related syncope is suspected, and D dimer when pulmonary embolism is suspected.
- Perform prolonged ECG monitoring (external or implantable) 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.
- Perform electrophysiological studies (EPS) in patients with unexplained syncope and bifascicular BBB or suspected tachycardia.
- Perform an exercise stress test (EST) in patients who experience syncope during or shortly after exertion.
- Consider basic autonomic function tests (Valsalva manoeuvre and deep-breathing test) and ambulatory blood pressure monitoring (ABPM) for the assessment of autonomic function in patients with suspected neurogenic orthostatic hypotension (OH).

**Treatment:**

- In patients with severe forms of reflex syncope, select one or more of the following additional specific treatments according to the clinical features:
  - ✓ Counter-pressure manoeuvres (including tilt training if needed) in young patients with prodromes.
  - ✓ Discontinuation/reduction of hypotensive therapy targeting a systolic BP of 140 mmHg in old hypertensive patients.
  - ✓ Pacemaker implantation in old patients with dominant cardioinhibitory forms.
  - ✓ Midodrine or fludrocortisone in young patients with low BP phenotype.
  
- In patients with OH, select one or more of the following additional specific treatments according to clinical severity:
  - ✓ Education regarding lifestyle manoeuvres.
  - ✓ Adequate hydration and salt intake.
  - ✓ Discontinuation/reduction of hypotensive therapy.
  - ✓ Counter-pressure manoeuvres.
  - ✓ Abdominal binders and/or support stockings.
  - ✓ Head-up tilt sleeping.
  - ✓ Midodrine or fludrocortisone.
  
- Balance the benefits and harm of implantable cardiac defibrillator (ICD) implantation in patients with unexplained syncope at high risk of sudden cardiac death (SCD) e.g. those affected by left ventricle systolic dysfunction, hypertrophic cardiomyopathy (HCM), arrhythmogenic right ventricular cardiomyopathy (ARVC), or inheritable arrhythmogenic disorders.
  
- Re-evaluate the diagnostic process and consider alternative therapies if the above rules fail or are not applicable to an individual patient. Bear in mind that guidelines are only advisory. Even though they are based on the best available scientific evidence, treatment should be tailored to an individual patient's need.

## **2.1 Purpose of this policy**

This document aims to be patient-orientated and focused on therapy, and to reduce the risk of recurrence and the life-threatening consequences of syncope recurrence. Advice is given on the most appropriate therapy based on the practical expertise of the members of the Task Force, as well as therapeutic and decision-making algorithms. Finally, it's recognizable that one major challenge in syncope management is the reduction of inappropriate admissions and inappropriate use of tests while maintaining the safety of the patient. Thus, we provide you with a care pathway management of patients with TLOC from their arrival in the emergency department (ED), and give practical instructions on outpatient workup aimed at reducing hospitalization, under- and misdiagnoses, and costs.

## **2.2 Scope**

This document provides guidance for any professional involved in the clinical management of patients presenting to either primary or secondary care with syncope. This will include:

- Consultants
- SAS doctors
- SpRs
- Junior Doctors
- Specialist Nurses
- Nursing Staff
- General Practitioners

## **3. Introduction**

A great number of guidelines have been issued in recent years by the European Society of Cardiology (ESC), as well as by other societies and organizations, given the impact of syncope on clinical practice. Thus, quality criteria for the development of guidelines have been established in order to make all decisions practical and easy to follow for healthcare professionals.

Syncope is defined as TLOC due to cerebral hypoperfusion, characterized by a rapid onset, short duration, and spontaneous complete recovery. Syncope shares many clinical features with other disorders; it therefore presents in many differential diagnoses. Syncope thus can be classified based on the predominant cause or pathophysiology, see table 1. TLOC is defined as a state of real or apparent loss of consciousness (LOC) with loss of awareness, characterized by amnesia for the period

of unconsciousness, abnormal motor control, loss of responsiveness, and a short duration.

The clinical features characterizing TLOC are usually derived from history taking from patients and eye-witnesses. When a patient first presents with possible TLOC, history taking should first establish whether there was indeed a TLOC. TLOC is probably syncope when:

- ✓ There are signs and symptoms specific for reflex syncope, syncope due to OH, or cardiac syncope
- ✓ Signs and symptoms specific for other forms of TLOC (head trauma, epileptic seizures, psychogenic TLOC, and/or rare causes) are absent.

#### **4. Classification of syncope**

The pathophysiological classification centers on a fall in systemic blood pressure (BP) with a decrease in global cerebral blood flow as the defining characteristic of syncope. Systemic BP is the product of cardiac output and total peripheral resistance; a fall in either can cause syncope.

There are three primary causes of a low total peripheral resistance. The first is decreased reflex activity causing vasodilatation through withdrawal of sympathetic vasoconstriction 'vaso-depressive type' of reflex syncope. The second is a functional impairment, and the third a structural impairment of the autonomic nervous system.

There are four primary causes of low cardiac output. The first is a reflex bradycardia, known as cardio-inhibitory reflex syncope. The second concerns cardiovascular causes: arrhythmia, structural disease including pulmonary embolism, and pulmonary hypertension. The third is inadequate venous return due to volume depletion or venous pooling. Finally, chronotropic and inotropic incompetence through autonomic failure may impair cardiac output.

**Table 1: Classification of syncope**

Neurally mediated	OH syncope	Cardiac syncope
<b>Vasovagal</b>	<b>Drug induced</b>	<b>Arrhythmias</b>
Orthostatic Emotional	Vasodilators Diuretics	Bradycardiac Tachycardia
<b>Situational</b>	<b>Volume depletion</b>	<b>Structural heart disease</b>
Cough Micturition Post exercise	Haemorrhage	Aortic stenosis HCM Ischaemic heart disease Valve disease
	<b>Primary autonomic failure</b>	
	Parkinson's disease	
	<b>Secondary autonomic failure</b>	
	Diabetes Amyloidosis	

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### 5.1 Initial evaluation of syncope

Normally the presenting complaint of syncope can be established. The primary aim for a clinician is then to establish an underlying diagnosis, especially those associated with the potential for rapid clinical deterioration. It is the acute underlying disease that most frequently determines short-term adverse events rather than the syncope itself. Subsequent management will focus on treating this underlying cause. Many (40–45%) non-cardiovascular and some cardiovascular life-threatening underlying conditions are obvious in the ED.

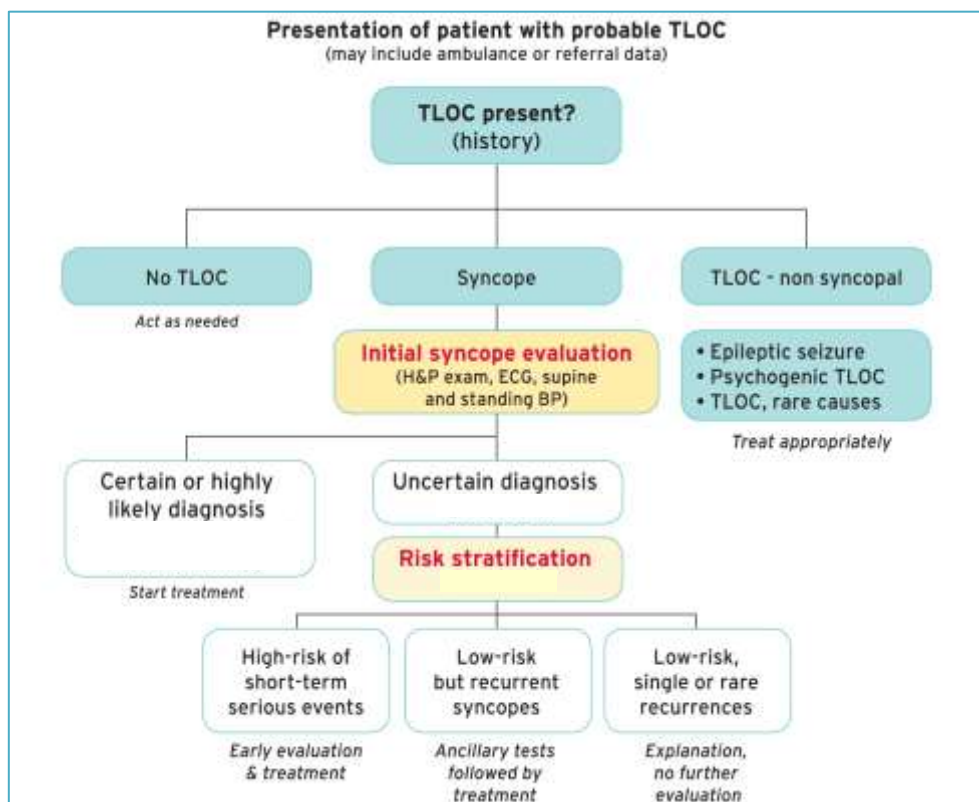
Approximately 50% of patients who present to the ED with syncope are admitted. The composite estimate of outcomes is that in the next 7–30 days, only 0.8% die and 6.9% have a non-fatal severe outcome whilst in the ED, while another 3.6% have a post-ED serious outcome.



Unnecessary admission in low-risk patients can be harmful. Whereas it is crucial to identify these high-risk patients to ensure early, rapid, and intensive investigation, not all patients at high risk need hospitalisation.

Figure 1 below provides a summary pathway from the initial assessment of syncope.

**Figure 1. Flow diagram for the initial evaluation and risk stratification of patients with syncope.**



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## 5.2 Risk stratification of syncope

Patients presenting with syncope can be classified into 3 different categories depending on their presenting history, past medical history, examination findings and ECG, see table 2 and figure 2.

**Table 2: Risk assessment of syncope**

Syncopal event	Past medical history	Examination	ECG
<b>Low risk</b>			
Prodrome history	Long history of recurrent syncope	Normal exam	Normal ECG
Sudden trigger			
Long standing			
Standing up			
Head rotation			
<b>High risk</b>			
New chest discomfort or headache	Structural heart disease	Unexplained systolic BP <90mmHg	Ischaemic ECG Mobitz II, 3rd degree AV block
Palpitation		Undiagnosed systolic murmur	Slow AF or persistent bradycardia <40bpm
Sitting position		Evidence of GI bleed	VT
Family history SCD		Persistent bradycardia <40bpm	
No warning history			

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➤ **Patients with low-risk features:**

These patients do not need further diagnostic tests in the ED as they are likely to have reflex, situational, or orthostatic syncope. They may benefit from reassurance, or counselling sheet for patients affected by reflex syncope. Referral to the SHSCT ambulatory care unit (ACU) should be considered for further investigation and treatment.

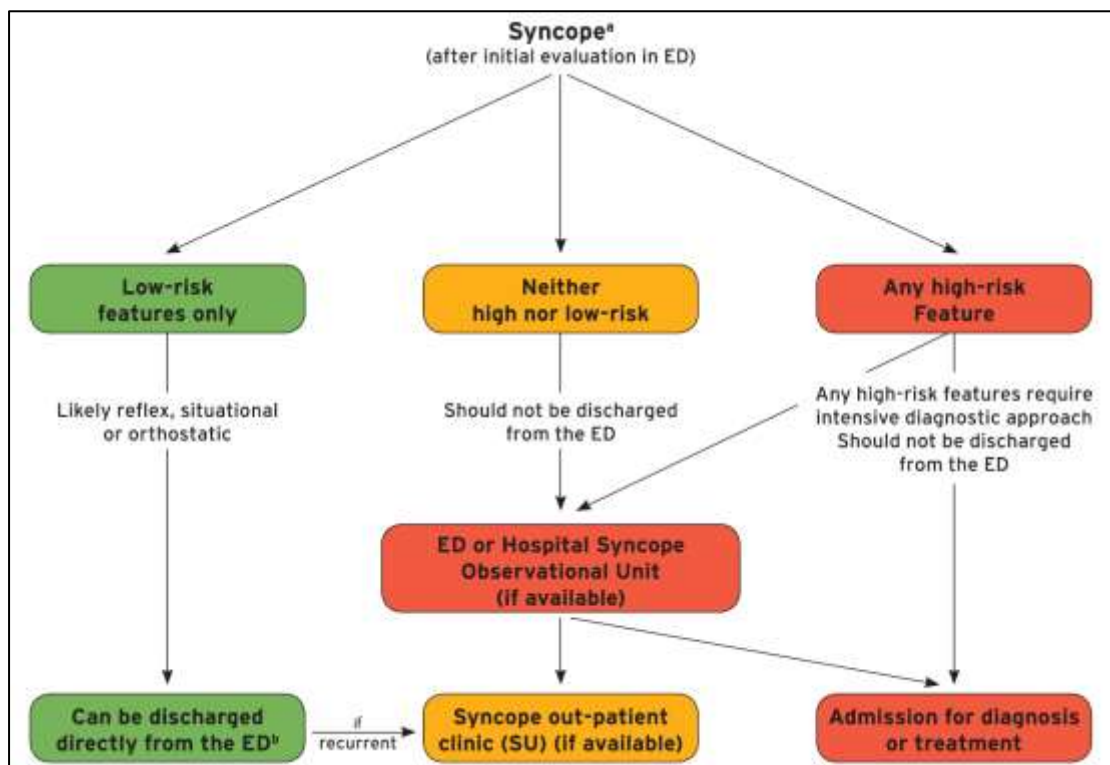
➤ **Patients with high-risk features:**

These patients require an intensive diagnostic approach and may need urgent treatment and admission. These patients should be monitored in a setting where resuscitation can be performed in case of deterioration.

➤ **Patients that have neither high- nor low-risk features:**

These patients will require expert syncope opinion, which can be safely managed in an outpatient setting. There is no direct evidence that admitting patients to hospital changes their outcome, whilst there is evidence that management in an ED observation unit and/or fast-track to an ambulatory unit such as the SHSCT cardiology ACU is beneficial.

**Figure 2: Emergency department risk stratification flow chart**



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## **6. Diagnostics and evaluation**

### **6.1 Carotid sinus massage (CSM)**

A ventricular pause lasting >3 seconds and/or a fall in systolic BP of >50 mmHg is known as carotid sinus hypersensitivity. Carotid sinus hypersensitivity is a common finding in older men without syncope; abnormal responses are frequently observed ( $\leq 40\%$ ) in patients without syncope, especially if they are older and affected by cardiovascular disease.

Carotid sinus hypersensitivity in patients with unexplained syncope may be a non-specific finding because it is present in  $\leq 40\%$  of older populations and should be used with caution for diagnosis of the mechanism of syncope.

CSM should be performed with the patient in the supine and upright positions, and with continuous beat-to-beat BP monitoring. This may be more readily performed in the tilt laboratory.

Although neurological complications are very rare, the risk of provocation of TIA with the massage suggests that CSM should be undertaken with caution in patients with previous TIA, stroke, or known carotid stenosis >70%.

### **6.2 Orthostatic challenge**

Changing from the supine to the upright position produces a displacement of blood from the thorax to the lower limbs and abdominal cavity that leads to a decrease in venous return and cardiac output. In the absence of compensatory mechanisms, a fall in BP may lead to syncope. The diagnostic criteria for OH have been defined by consensus. Currently, there are three methods for assessing the response to change in posture from supine to active standing, head-up tilt, and 24-h ambulatory BP monitoring (ABPM), see figures 3, 4 and 5.

Abnormal BP fall is defined as a progressive and sustained fall in systolic BP from baseline value  $\geq 20$  mmHg or diastolic BP  $\geq 10$  mmHg, or a decrease in systolic BP to <90 mmHg.

Features of syncope highly suggestive of OH include syncope and presyncope that are present during standing, absent while lying, and less severe or absent while sitting; a predilection for the morning; sitting or lying down must help; complaints may get worse immediately after exercise, and after meals or in high temperatures.

**Figure 3: Active standing**

Recommendations
<b>Indications</b>
Intermittent determination by sphygmomanometer of BP and HR while supine and during active standing for 3 min are indicated at initial syncope evaluation. <sup>20,103,104</sup>
Continuous beat-to-beat non-invasive BP and HR measurement may be preferred when short-lived BP variations are suspected, such as in initial OH. <sup>20,103,104</sup>
<b>Diagnostic criteria</b>
Syncope due to OH is confirmed when there is a fall in systolic BP from baseline value $\geq 20$ mmHg or diastolic BP $\geq 10$ mmHg, or a decrease in systolic BP to $< 90$ mmHg that reproduces spontaneous symptoms. <sup>6,20,103,104</sup>
Syncope due to OH should be considered likely when there is an asymptomatic fall in systolic BP from baseline value $\geq 20$ mmHg or diastolic BP $\geq 10$ mmHg, or a decrease in systolic BP to $< 90$ mmHg, and symptoms (from history) are consistent with OH. <sup>6,20,103,104</sup>
Syncope due to OH should be considered likely when there is a symptomatic fall in systolic BP from baseline value $\geq 20$ mmHg or diastolic BP $\geq 10$ mmHg, or a decrease in systolic BP to $< 90$ mmHg, and not all of the features (from history) are suggestive of OH. <sup>6,20,103,104</sup>
POTS should be considered likely when there is an orthostatic HR increase ( $> 30$ b.p.m. or to $> 120$ b.p.m. within 10 min of active standing) in the absence of OH that reproduces spontaneous symptoms. <sup>6,20,103,104</sup>
Syncope due to OH may be considered possible when there is an asymptomatic fall in systolic BP from baseline value $\geq 20$ mmHg or diastolic BP $\geq 10$ mmHg, or a decrease in systolic BP to $< 90$ mmHg, and symptoms (from history) are less consistent with OH. <sup>6,20,103,104</sup>

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The clinical situation corresponding to tilt-induced syncope is that which is triggered by prolonged standing. The test should be considered:

To confirm a diagnosis of reflex syncope in patients in whom this diagnosis was suspected but not confirmed by initial evaluation

- ✓ For the assessment of autonomic failure, especially for the reproduction of delayed OH (which could not be detected by active standing because of its delayed onset) and postural orthostatic tachycardia syndrome (POTS).
- ✓ Tilt testing may be helpful in separating syncope from PPS, see figure 4.

A negative tilt table response does not exclude a diagnosis of reflex syncope. 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. 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.

**Figure 4: Tilt testing**

<b>Recommendations</b>
<b>Indications</b>
Tilt testing should be considered in patients with suspected reflex syncope, OH, POTS, or PPS. <sup>23,24,105–109,111–117</sup>
Tilt testing may be considered to educate patients to recognize symptoms and learn physical manoeuvres. <sup>119–121</sup>
<b>Diagnostic criteria</b>
Reflex syncope, OH, POTS, or PPS should be considered likely if tilt testing reproduces symptoms along with the characteristic circulatory pattern of these conditions. <sup>23,24,105–109,111–117</sup>

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Basic autonomic functions tests help identify autonomic failure as the underlying cause of syncope, see figure 5. Whenever possible, reproduction of the trigger situation (e.g. coughing, swallowing, laughing, bass instrument playing, weightlifting) under beat to-beat non-invasive heart rate and blood pressure measurement should be performed in patients with suspected situational syncope.

The effects of age and sex should be considered when interpreting autonomic function tests. Compliance with autonomic function tests may be limited in patients with dementia. Patients with tremor or Parkinsonism may not succeed in performing the sustained hand grip test. The cold pressure test may be uncomfortable in patients with Raynaud’s phenomena.

Figure 5: Basic autonomic functions tests

Recommendations
<b>Valsalva manoeuvre</b>
Valsalva manoeuvre should be considered for the assessment of autonomic function in patients with suspected neurogenic OH. <sup>138-143</sup>
Valsalva manoeuvre may be considered for confirming the hypotensive tendency induced by some forms of situational syncope, e.g. coughing, brass instrument playing, singing, and weightlifting. <sup>144</sup>
<b>Deep-breathing test</b>
Deep-breathing tests should be considered for the assessment of autonomic function in patients with suspected neurogenic OH. <sup>142,143,146,147</sup>
<b>Other autonomic function tests</b>
Other autonomic function tests (30:15 ratio, cold pressure test, sustained hand grip test, and mental arithmetic test) may be considered for the assessment of autonomic function in patients with suspected neurogenic OH. <sup>13,142,143,147</sup>
<b>ABPM</b>
ABPM is recommended to detect nocturnal hypertension in patients with autonomic failure. <sup>140,148-151</sup>
ABPM should be considered to detect and monitor the degree of OH and supine hypertension in daily life in patients with autonomic failure. <sup>152,153</sup>
ABPM and HBPM may be considered to detect whether BP is abnormally low during episodes suggestive of orthostatic intolerance.

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### 6.3 Electrocardiographic assessment

The role of ECG monitoring cannot be defined in isolation. As a rule, ECG monitoring is indicated only when there is a high pre-test probability of identifying an arrhythmia associated with syncope. Arrhythmic syncope is confirmed when a correlation between syncope and an arrhythmia (bradyarrhythmia or tachyarrhythmia) is detected. In the absence of syncope, arrhythmic syncope should be considered likely when periods of Mobitz II second- or third degree AV block or a ventricular pause >3 seconds (with the possible exception of young trained persons, during sleep or rate controlled atrial fibrillation), or rapid prolonged paroxysmal supraventricular tachycardia (SVT) or ventricular tachycardia (VT) are detected.

#### ➤ **In hospital monitoring (telemetry):**

- ✓ In-hospital monitoring (in bed or by telemetry) is warranted in patients with high-risk clinical features as previously defined suggesting arrhythmic syncope, especially if the monitoring is applied immediately after syncope. Although the diagnostic yield of ECG monitoring varies from 1.9–17.6%, it is justified by the need to avoid immediate risk to the patient.

➤ **Holter monitoring:**

- ✓ Holter monitoring in syncope may be of more value if symptoms are frequent. Daily single or multiple episodes of LOC might increase the potential for symptom–ECG correlation.

➤ **Implantable loop recorders:**

- ✓ ILR is indicated in an early phase of evaluation in patients with recurrent syncope of uncertain origin, absence of high-risk criteria (table 2), and a high likelihood of recurrence within the battery life of the device. Suspected or certain reflex syncope presenting with frequent or severe syncopal Episodes, epilepsy was suspected but the treatment has proven ineffective or unexplained falls.

#### 6.4 Electrophysiological study

EPS is useful in asymptomatic sinus bradycardia (suspected sinus arrest causing syncope), bifascicular bundle branch block (impending high-degree AV block), and suspected tachycardia. EPS is generally not useful in patients with syncope, normal ECG, no heart disease, and no palpitations, see figure 6.

- **Asymptomatic bradycardia:**

- ✓ The pre-test probability of bradycardia-related syncope is relatively high when there is asymptomatic sinus bradycardia (<50 b.p.m.) or sinoatrial block, usually documented by 12-lead ECG or ECG monitoring. The prognostic value of a prolonged sinus node recovery time (SNRT) is not well defined. An abnormal response is defined as  $\geq 1.6$  or 2 s for SNRT, or  $\geq 525$ ms for corrected SNRT.

- **Syncope with bifascicular BBB:**

- ✓ Patients with bifascicular block and syncope are at higher risk of developing high-degree AV block. A prolonged HV interval  $\geq 70$  ms, or induction of second- or third-degree AV block by pacing or by pharmacological stress (ajmaline, procainamide, or disopyramide), identifies a group at higher risk of developing AV block.

- **Syncope with suspected tachycardia:**

- ✓ In patients with syncope preceded by a sudden onset of brief palpitations suggesting SVT or VT, an EPS may be indicated to assess the exact mechanism, especially when a curative catheter ablation procedure is considered to be



beneficial. In patients with a previous myocardial infarction and preserved left ventricular ejection fraction (LVEF), induction of sustained monomorphic VT is strongly predictive of the cause of syncope, whereas the induction of ventricular fibrillation (VF) is considered a non-specific finding. The absence of induction of ventricular arrhythmias identifies a group at lower risk of arrhythmic syncope.

**Figure 6: Electrophysiological study**

Recommendations
<b>Indications</b>
In patients with syncope and previous myocardial infarction, or other scar-related conditions, EPS is indicated when syncope remains unexplained after non-invasive evaluation. <sup>210</sup>
In patients with syncope and bifascicular BBB, EPS should be considered when syncope remains unexplained after non-invasive evaluation. <sup>188,214–217,221</sup>
In patients with syncope and asymptomatic sinus bradycardia, EPS may be considered in a few instances when non-invasive tests (e.g. ECG monitoring) have failed to show a correlation between syncope and bradycardia. <sup>210–212</sup>
In patients with syncope preceded by sudden and brief palpitations, EPS may be considered when syncope remains unexplained after non-invasive evaluation.
<b>EPS-guided therapy</b>
In patients with unexplained syncope and bifascicular BBB, a pacemaker is indicated in the presence of either a baseline H-V interval of $\geq 70$ ms, second- or third-degree His-Purkinje block during incremental atrial pacing, or with pharmacological challenge. <sup>188,214–217,221</sup>
In patients with unexplained syncope and previous myocardial infarction, or other scar-related conditions, it is recommended that induction of sustained monomorphic VT is managed according to the current ESC Guidelines for VA. <sup>46</sup>
In patients without structural heart disease with syncope preceded by sudden and brief palpitations, it is recommended that the induction of rapid SVT or VT, which reproduce hypotensive or spontaneous symptoms, is managed with appropriate therapy according to the current ESC Guidelines. <sup>46,222</sup>
In patients with syncope and asymptomatic sinus bradycardia, a pacemaker should be considered if a prolonged corrected SNRT is present. <sup>210–212</sup>

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### 6.5 Echocardiography

For patients with suspected heart disease, echocardiography serves to confirm or refute the suspicions in equal proportions and plays an important role in risk stratification. Echocardiography identifies the cause of syncope in very few patients when no more tests are needed (i.e. severe aortic stenosis, obstructive cardiac tumors or thrombi, pericardial tamponade, or aortic dissection).

Upright or semi-supine exercise stress echocardiography to detect provokable left ventricular outflow tract obstruction should be considered in patients with HCM that complain of exertional or postural syncope, particularly when it recurs during similar circumstances.

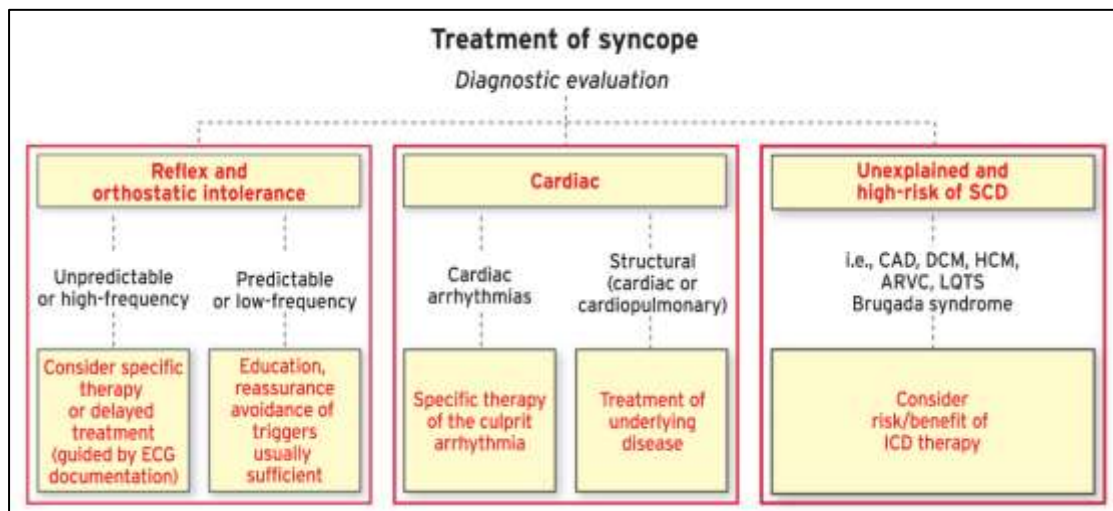
For patients without suspected cardiac disease after history taking, physical examination, and electrocardiography, the ECG does not provide additional useful information, suggesting that syncope alone is not an indication for echocardiography.

Computed tomography or MRI should be considered in selected patients presenting with syncope of suspected cardiac structural origin when echocardiography is not diagnostic.

## 7. Treatment and management

The general framework of treatment is based on risk stratification and the identification of specific mechanisms when possible as previously discussed. The figure below summarizes the general approach in treating and managing cases based on the underlying mechanism, see figure 7.

**Figure 7: General framework of treatment is based on risk stratification and the identification of specific mechanisms when possible**



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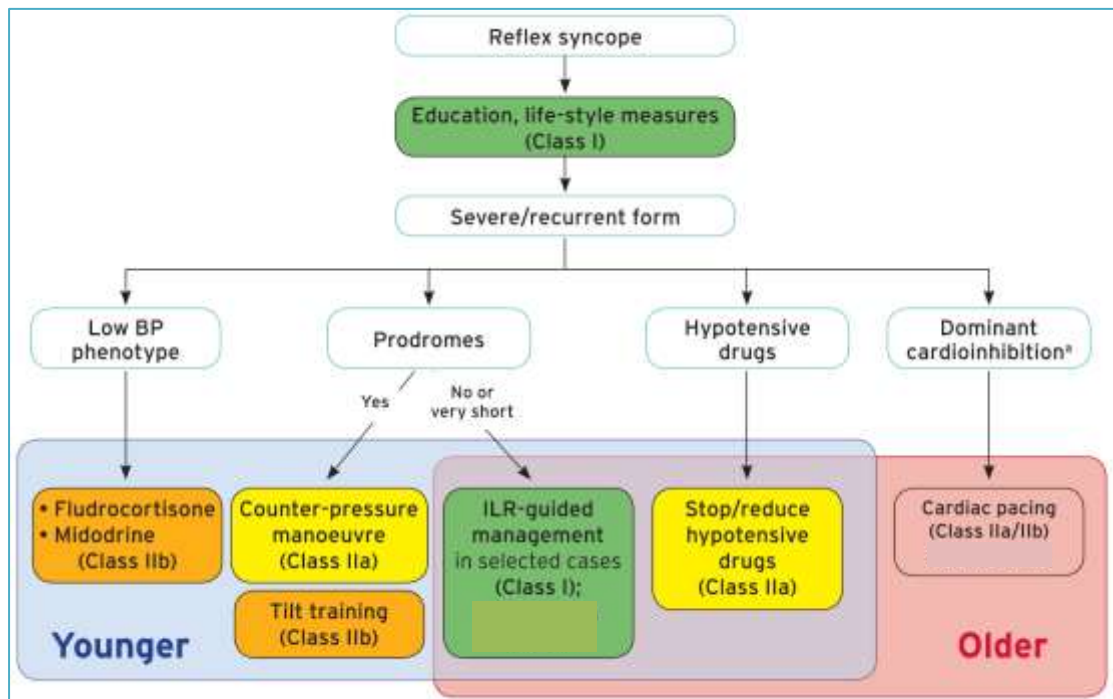
### 7.1 Reflex syncope:

- ✓ Most of these patients can be managed with adequate education and reassurance. In cases which are recurrent or more severe, management is variable depending on the age group and the underlying pattern of syncope (see figure 8 and 10 for more details).
- ✓ In general, no therapy can completely prevent syncope recurrence during long-term follow-up. A decrease of the syncope burden is a reasonable goal of therapy. The fact that pacing may be effective does not mean that it is also always necessary.
- ✓ It must be emphasized that the decision to implant a pacemaker needs to be made in the clinical context of a benign condition that frequently affects young patients. Thus, cardiac pacing should be limited to a highly selected small proportion of patients affected by severe reflex syncope (Figure 9). Patients suitable for cardiac pacing are older with a history of recurrent syncope beginning in middle or older age and with frequent injuries, probably due to presentation without warning. Syncope recurrence is still expected to occur despite cardiac pacing in a minority of patients. Patients with a negative tilt test response will have a risk of syncope recurrence of as low as that observed in patients paced for intrinsic AV block.

Patients should be given advice on:

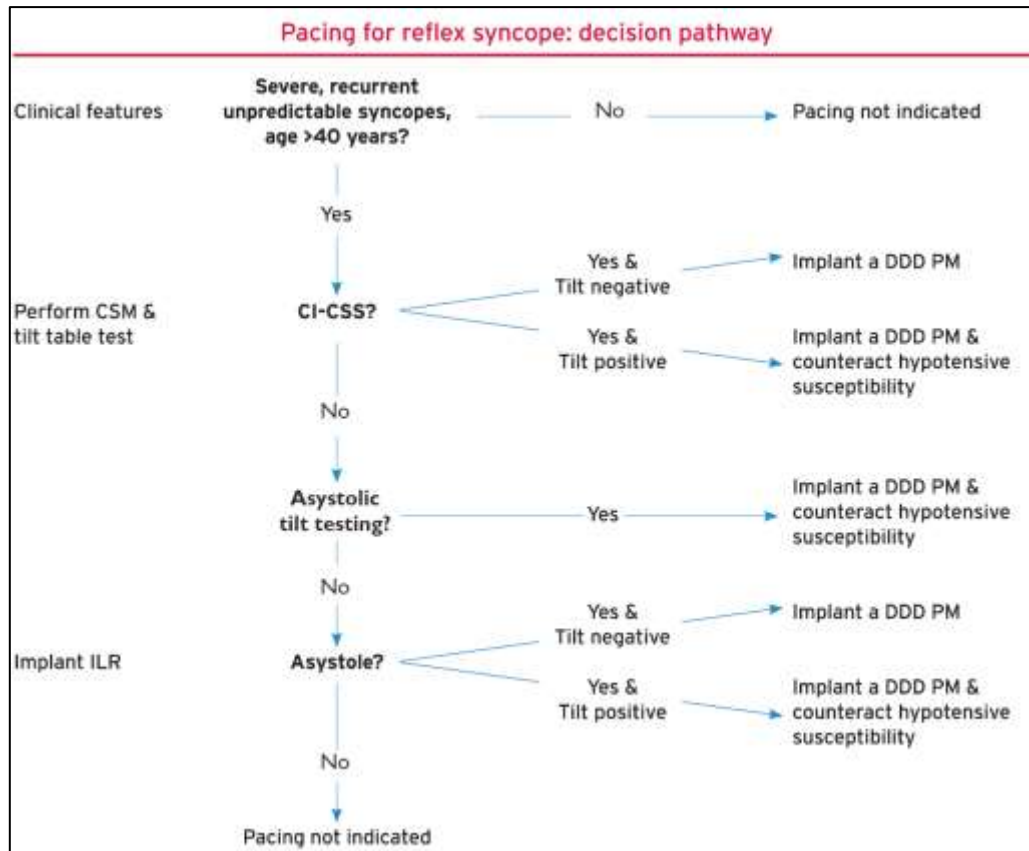
- Isometric counter pressure manoeuvres (leg crossing or arm tensing)
- Sit down immediately during episodes
- If possible, lie down and raise legs into the air
- Squat if you are unable to lie down
- Cross ankles and tense calf muscles tightly
- Maintain good hydration
- Avoid warm claustrophobic situations
- Go from sitting to standing slowly
- Avoid any known triggers
- Support stockings to reduce blood pooling
- Stop any contributing drugs (at advice of your doctor)
- Reduce alcohol intake
- Your doctor may consider tablet therapy if the above fails

**Figure 8: Schematic practical decision pathway for the first-line management of reflex syncope (based on patient’s history and tests) according to age, severity of syncope, and clinical forms.**



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Figure 9: Summary of cardiac pacing indications in reflex syncope



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Figure 10: Treatment of reflex syncope

Recommendations
<b>Education and lifestyle modifications</b>
Explanation of the diagnosis, the provision of reassurance, and explanation of the risk of recurrence and the avoidance of triggers and situations are indicated in all patients. <i>Supplementary Data Table 10</i>
<b>Discontinuation/reduction of hypotensive therapy</b>
Modification or discontinuation of hypotensive drug regimen should be considered in patients with vasodepressor syncope, if possible. <sup>260–262</sup>
<b>Physical manoeuvres</b>
Isometric PCM should be considered in patients with prodromes who are <60 years of age. <sup>119–123,263,264</sup>
Tilt training may be considered for the education of young patients. <sup>265–272</sup>
<b>Pharmacological therapy</b>
Fludrocortisone may be considered in young patients with the orthostatic form of VVS, low-normal values of arterial BP, and the absence of contraindication to the drug. <sup>275</sup>
Midodrine may be considered in patients with the orthostatic form of VVS. <sup>276</sup>
Beta-adrenergic blocking drugs are not indicated. <sup>279,280</sup>
<b>Cardiac pacing</b>
Cardiac pacing should be considered to reduce syncopal recurrences in patients aged >40 years, with spontaneous documented symptomatic asystolic pause(s) >3 s or asymptomatic pause(s) >6 s due to sinus arrest, AV block, or the combination of the two. <sup>184,185,200,292</sup>
Cardiac pacing should be considered to reduce syncope recurrence in patients with cardioinhibitory carotid sinus syndrome who are >40 years with recurrent frequent unpredictable syncope. <sup>30,292,293</sup>
Cardiac pacing may be considered to reduce syncope recurrences in patients with tilt-induced asystolic response who are >40 years with recurrent frequent unpredictable syncope. <sup>292,297,298,303</sup>
Cardiac pacing may be considered to reduce syncope recurrences in patients with the clinical features of adenosine-sensitive syncope. <sup>5,227,286</sup>
Cardiac pacing is not indicated in the absence of a documented cardioinhibitory reflex. <sup>299,300</sup>

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## 7.2 Orthostatic syncope:

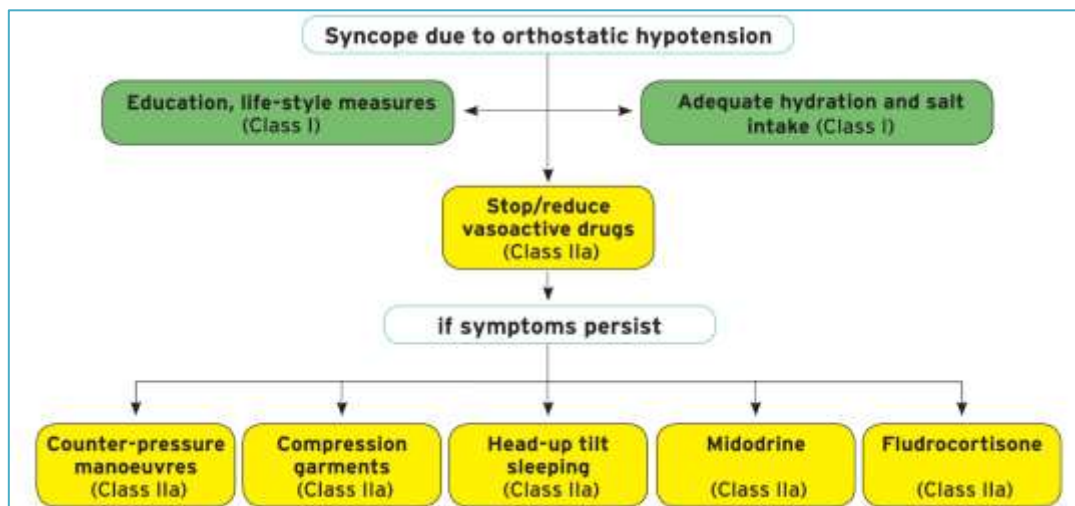
- ✓ Current management strategies for OH are summarized in Figure 11.
- ✓ **Midodrine:** The alpha-agonist midodrine is a useful addition to first-line treatment in patients with chronic autonomic failure. It cannot be regarded as a cure, nor is it helpful in all affected patients, but it is very useful in some. There is no doubt that midodrine increases BP both in the supine and upright posture, and ameliorates the symptoms of OH. Midodrine (2.5–10 mg t.i.d) was shown to be effective in three randomized placebo-controlled trials.

- ✓ **Fludrocortisone:** Fludrocortisone (0.1–0.3 mg once daily) is a mineralocorticoid that stimulates renal sodium retention and expands fluid volume. The evidence in favor of fludrocortisone is from two small observational studies (in combination with head-up sleeping) and one double-blind trial in 60 patients; the observational studies showed hemodynamic benefit and, in the trial, treated patients were less symptomatic with higher BP.

Similar to reflex syncope, patients should be given advice on:

- Isometric counter pressure manoeuvres (leg crossing or arm tensing)
- Sit down immediately during episodes
- If possible, lie down and raise legs into the air
- Squat if you are unable to lie down
- Cross ankles and tense calf muscles tightly
- Maintain good hydration
- Avoid warm claustrophobic situations
- Go from sitting to standing slowly
- Avoid any known triggers
- Support stockings to reduce blood pooling
- Stop any contributing drugs (at advice of your doctor)
- Reduce alcohol intake
- Your doctor may consider tablet therapy if the above fails

**Figure 11: Treatment of OH syncope**



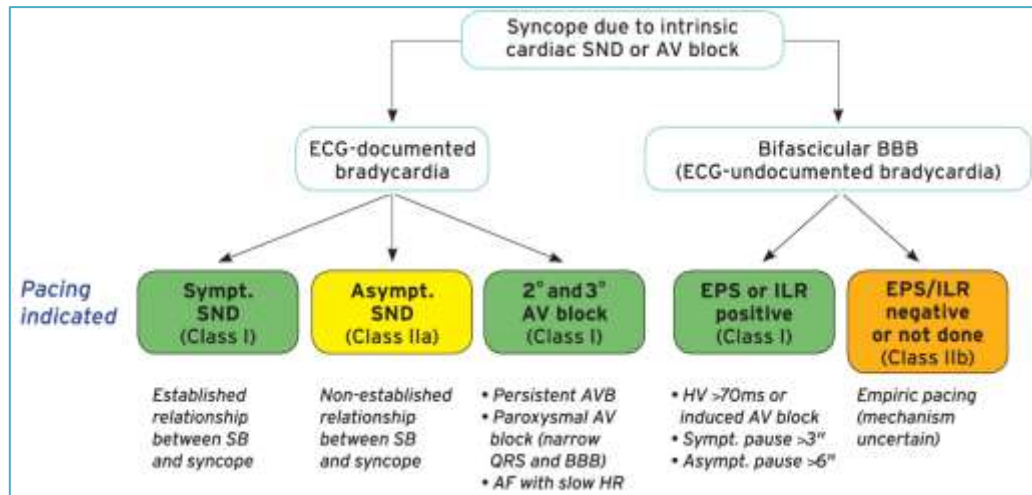
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### 7.3 Cardiac arrhythmias:

- ✓ Current management strategies in patients with syncope due to intrinsic cardiac bradycardia are summarized in (Figure 12 and 13). When the correlation between symptoms and ECG is established, there is general consensus that cardiac pacing is effective and useful for symptom relief. When the correlation between symptoms and ECG is not established, cardiac pacing may be reasonable in patients with intrinsic sinus node disease, syncope, and documentation of asymptomatic pause(s).
- ✓ There is strong consensus that in patients with bifascicular BBB with a positive EPS or documentation of paroxysmal AV block during prolonged ECG monitoring, cardiac pacing is highly effective in preventing syncope recurrence. The evidence of efficacy of empirical pacing strategy is weak and the estimate of benefit is uncertain.
- ✓ The major factors predicting the efficacy of pacing in preventing syncope recurrence are an established relationship between symptoms and bradycardia and the absence of associated hypotensive susceptibility. When this relationship is less established, or some hypotensive mechanism is present, syncope can recur in a minority of patients.
- ✓ Pacing is not indicated in unexplained syncope without evidence of any conduction disturbance.
- ✓ Elderly patients with bifascicular BBB and unexplained syncope after a reasonable workup might benefit from empirical pacemaker implantation, especially if syncope is unpredictable (with no or short prodromes) or has occurred in the supine position or during effort.
- ✓ When syncope is due to VT (including when the diagnosis is established by the induction of VT during EPS), catheter ablation should be always attempted when feasible in addition to ICD implantation. Current management strategies in patients with syncope due to intrinsic cardiac tachyarrhythmia are summarized in Figure 14.

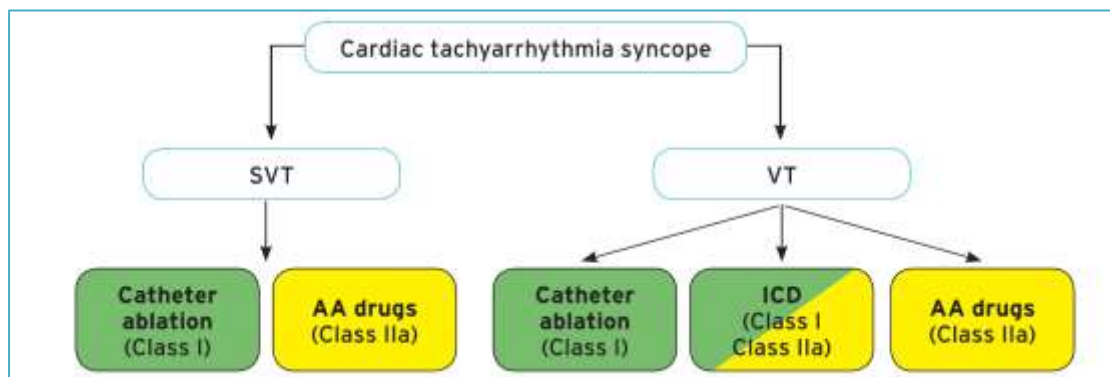


**Figure 12: Summary of indications for pacing in patients with syncope due to intrinsic cardiac bradycardia**



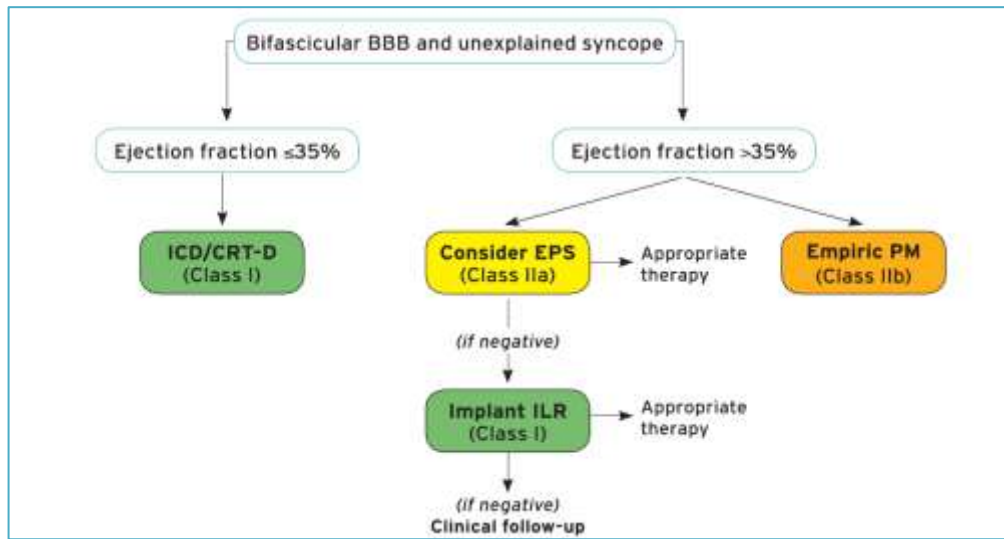
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**Figure 13: Choice of therapy for patients presenting with syncope due to cardiac tachyarrhythmias as the primary cause**



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**Figure 14: Choice of therapy for patients presenting with syncope and BBB**



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**Figure 15: Treatment of syncope due to cardiac arrhythmias.**

<b>Recommendations</b>
<b>Bradycardia (intrinsic)</b>
Cardiac pacing is indicated when there is an established relationship between syncope and symptomatic bradycardia due to: <ul style="list-style-type: none"> <li>• Sick sinus syndrome.<sup>210-212,334-338</sup></li> <li>• Intrinsic AV block.<sup>200,255,341</sup></li> </ul>
Cardiac pacing is indicated in patients with intermittent/paroxysmal intrinsic third- or second-degree AV block (including AF with slow ventricular conduction), although there is no documentation of a correlation between symptoms and ECGs.
Cardiac pacing should be considered when the relationship between syncope and asymptomatic sinus node dysfunction is less established. <sup>135,136,210-212,339,340</sup>
Cardiac pacing is not indicated in patients when there are reversible causes for bradycardia.
<b>Bifascicular BBB</b>
Cardiac pacing is indicated in patients with syncope, BBB, and a positive EPS or ILR-documented AV block. <sup>188,217</sup>
Cardiac pacing may be considered in patients with unexplained syncope and bifascicular BBB. <sup>217,255,344</sup>
<b>Tachycardia</b>
Catheter ablation is indicated in patients with syncope due to SVT or VT in order to prevent syncope recurrence. <sup>46</sup>
An ICD is indicated in patients with syncope due to VT and an ejection fraction $\leq 35\%$ . <sup>46</sup>
An ICD is indicated in patients with syncope and previous myocardial infarction who have VT induced during EPS. <sup>218</sup>
An ICD should be considered in patients with an ejection fraction $>35\%$ with recurrent syncope due to VT when catheter ablation and pharmacological therapy have failed or could not be performed. <sup>46</sup>
Antiarrhythmic drug therapy, including rate-control drugs, should be considered in patients with syncope due to SVT or VT.

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#### **7.4 Syncope in patients with high risk of SCD:**

- ✓ In general, a history of syncope in patients with structural heart disease or inheritable arrhythmia syndromes is associated with a two- to four-fold increased risk of death, but varies between specific conditions. Moreover, there have been very few studies on ICDs in patients with syncope associated with left ventricular dysfunction. The figure below (Figure 16), gives a summary of all the current recommendations and classes of evidence for convenience.

**Figure 16: A summary of recommendations in syncope associated with increased risk of SCD**

ARVC		HCM	
Recommendations	Class <sup>b</sup>	Recommendations	Class <sup>b</sup>
ICD implantation may be considered in patients with ARVC and a history of unexplained syncope.	<b>IIB</b>	It is recommended that decisions for ICD implantation in patients with unexplained syncope <sup>a</sup> are made according to the ESC HCM Risk-SCD score.	<b>I</b>
Instead of an ICD, an ILR should be considered in patients with recurrent episodes of unexplained syncope who are at low risk of SCD, based on a multiparametric analysis that takes into account the other known risk factors for SCD.	<b>Ila</b>	Instead of an ICD, an ILR should be considered in patients with recurrent episodes of unexplained syncope <sup>a</sup> who are at low risk of SCD, according to the HCM Risk-SCD score.	<b>Ila</b>
LQTS		Brugada	
Recommendations	Class <sup>b</sup>	Recommendations	Class <sup>b</sup>
ICD implantation in addition to beta-blockers should be considered in LQTS patients who experience unexplained syncope <sup>a</sup> while receiving an adequate dose of beta-blockers.	<b>Ila</b>	ICD implantation should be considered in patients with a spontaneous diagnostic type 1 ECG pattern and a history of unexplained syncope.	<b>Ila</b>
Left cardiac sympathetic denervation should be considered in patients with symptomatic LQTS when: (1) beta-blockers are not effective, not tolerated, or are contraindicated; (2) ICD therapy is contraindicated or refused; or (3) when patients on beta-blockers with an ICD experience multiple shocks.	<b>Ila</b>	Instead of an ICD, an ILR should be considered in patients with recurrent episodes of unexplained syncope <sup>a</sup> who are at low risk of SCD, based on a multiparametric analysis that takes into account the other known risk factors for SCD.	<b>Ila</b>
Instead of an ICD, an ILR should be considered in patients with recurrent episodes of unexplained syncope <sup>a</sup> who are at low risk of SCD based on a multiparametric analysis that takes into account the other known risk factors for SCD.	<b>Ila</b>		

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## **7.5 Syncope in the frail and comorbid patients:**

- ✓ The approach to the assessment and management of an older patient with syncope is similar to that of other age groups; however, there are a number of additional features pertinent to age-related comorbidity and frailty that warrant special attention
- ✓ Despite the lack of large controlled trials and an overall modest quality of studies, there is strong consensus that reduction or discontinuation of hypotensive drugs and psychotropic drugs clearly outweighs the undesirable effects (e.g. complications) of high BP. Further research is likely to have an important impact on our confidence in the estimate of effect. There is also a strong consensus that there is strong consensus that the management of unexplained falls should be the same as that for unexplained syncope. There may be a need for cognitive assessment and physical performance tests in addition to syncope evaluation. In some frail elderly patients, the rigor of assessment will depend on compliance with tests and on prognosis. Otherwise, the evaluation of mobile, non-frail, cognitively normal older adults must be performed as for younger individuals.
- ✓ Orthostatic BP measurements, CSM, and tilt testing are well tolerated, even in the frail elderly with cognitive impairment. Not infrequently, patients who present with unexplained falls although orthostatic BP measurements, CSM, and tilt testing reproduce syncope—may deny TLOC, thus demonstrating amnesia for TLOC.
- ✓ Failure of orthostatic BP to stabilize is present in up to 40% of community-dwelling people >80 years of age when BP is measured using phasic BP technology. Such failure of systolic BP to stabilize is a risk factor for subsequent falls and syncope.

Appendix 2 highlights a SHSCT approach to TLOC.

## **7.6 Driving**

This document cannot cover all driving restrictions. Ultimately the decision on whether a patient can drive or not falls with the driver and vehicle licensing agency (DVLA). All patients must be informed to self-refer to the DVLA on discharge. Further guidance on individual cases can be found on the DVLA website or on the SHSCT educational cardiology dropbox forum.

## **8. Update and review**

This document will be updated every 3 years. Revisions will be made ahead of the review date if new, relevant national guidelines are published. Where the revisions are significant and the overall policy is changed, the authors will ensure the revised document is taken through the standard consultation, approval and dissemination processes.

## **9. References**

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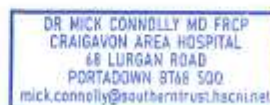
### Appendix 1 – Governance information

<b>Document title</b>	Guidelines for the management of syncope
<b>Date issued / approved:</b>	<b>5<sup>th</sup> August 2020</b>
<b>Date valid from:</b>	<b>5<sup>th</sup> August 2020</b>
<b>Date valid to:</b>	<b>Initial: 5<sup>th</sup> August 2023 Extended: 1<sup>st</sup> Jan 2027 (see below)</b>
<b>Brief summary of contents</b>	This document provides guidance for any professional involved in the clinical management of patients presenting to SHSCT with syncope.
<b>Policy objectives</b>	To provide clear speciality agreed guidelines and pathways for the diagnosis and clinical management of patients with syncope.
<b>Keywords</b>	Syncope Transient loss of consciousness Reflex syncope Vasovagal syncope Tilt testing Carotid sinus massage Implantable cardio defibrillator Loop recorder
<b>Authorship</b>	Dr David Mc Eneaney (cardiology clinical lead, consultant cardiologist) Kay Carroll (cardiology head of service) Dr Mick Connolly (consultant cardiologist) Dr Alastair Gray (consultant cardiologist) Dr Ian Menown (consultant cardiologist) Dr Neil Mc Aleavey (specialty doctor) Dr Maysah Salman (cardiology registrar)

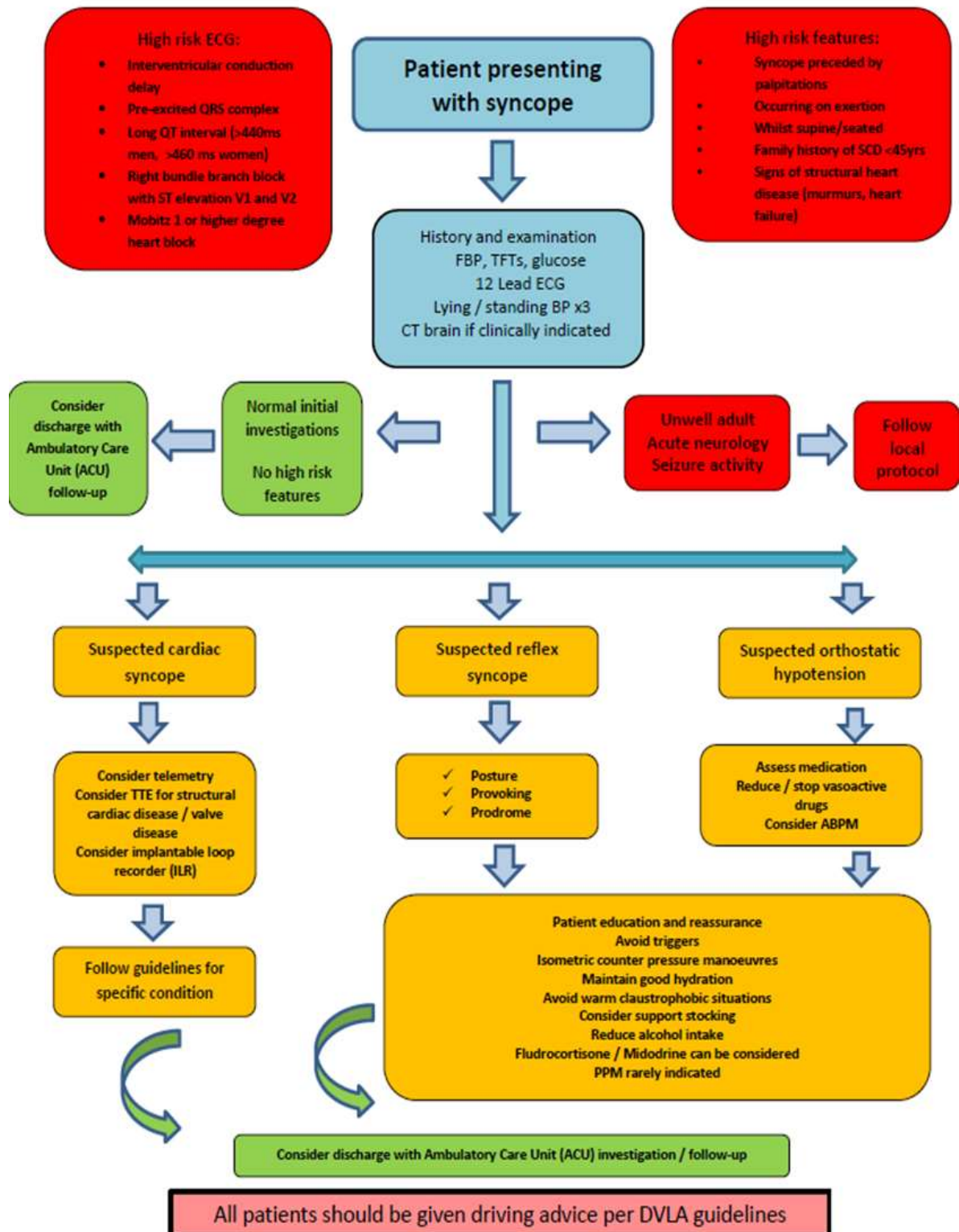
**Addendum Jan 2024:**

This policy was reviewed by the consultant cardiologists and discussed at the cardiology governance meeting in Winter 2023. It was sent out for a 6 week consultation period. No amendments were suggested by the wider cardiology team. Following universal unanimous agreement by the consultant body at this governance meeting it has been approved for 3 further years until 1<sup>st</sup> Jan 2027.

Signed: Dr Mick Connolly Consultant cardiologist

Appendix 2 – SHSCT syncope pathway



Developed by Dr Neil Mc Aleavey (cardiology specialty doctor)