

Syncope 2020

Michael Muellerleile M.D.

Nothing to disclose



Outline

- Control of blood pressure
- Evaluation of syncope
- Vasovagal syncope
- Orthostatic hypotension
- POTS

Citation

This slide set is adapted from the 2017 ACC/AHA/HRS Guideline for the Evaluation and Management of Patients With Syncope. Published on March 8, 2017, available at: *Journal of the American College of Cardiology* (www.onlinejacc.org/lookup/doi/10.1016/j.jacc.2017.03.003) and *Circulation* (<http://circ.ahajournals.org/lookup/doi/10.1161/CIR.0000000000000499>).

The full-text guidelines are also available on the following Web sites: ACC (www.acc.org), AHA (professional.heart.org), and the Heart Rhythm Society (www.hrsonline.org).

Hydrostatic pressure

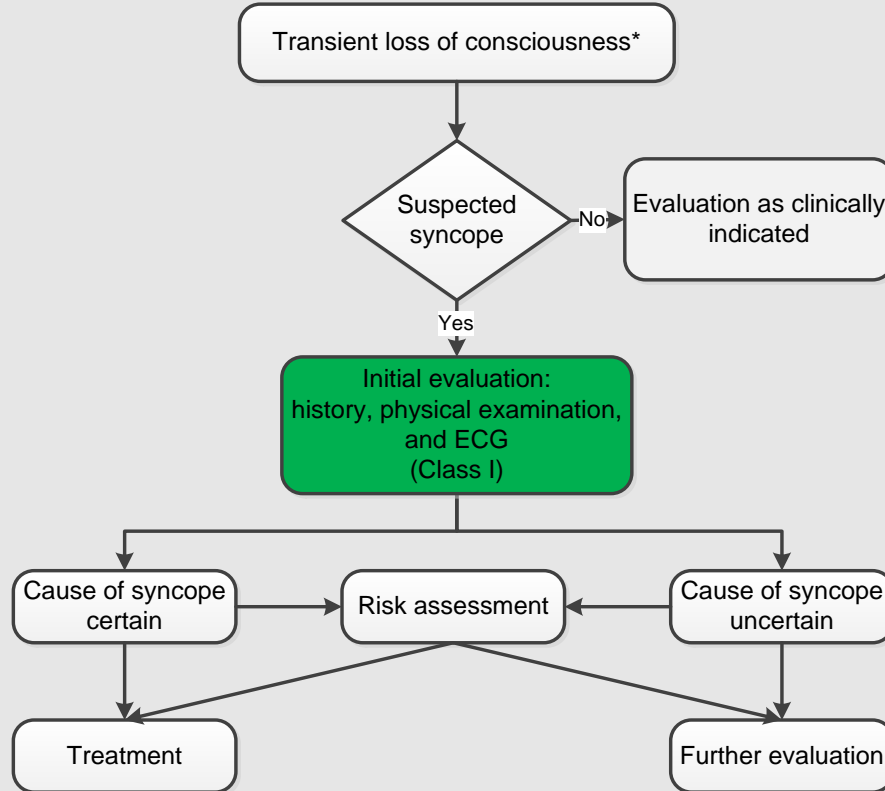
- The **pressure** in a liquid at a given depth is called the **hydrostatic pressure**. This can be calculated using the **hydrostatic equation**: $P = \rho * g * d$, where P is the **pressure**, ρ is the density of the liquid, g is gravity (9.8 m/s^2) and d is the depth (or height) of the liquid
- *rgb* air= 760 mm Hg, 29.9212 inches Hg, or 14.696 psi.
- Mercury 13.69 g/cm³
- Water 1.00g/cm³
- g= 980 cm/s²
- H is height in centimeters
- 120 mm Hg= 1644 mm of water (164 cm) 1.64 m

Homeostasis in blood pressure

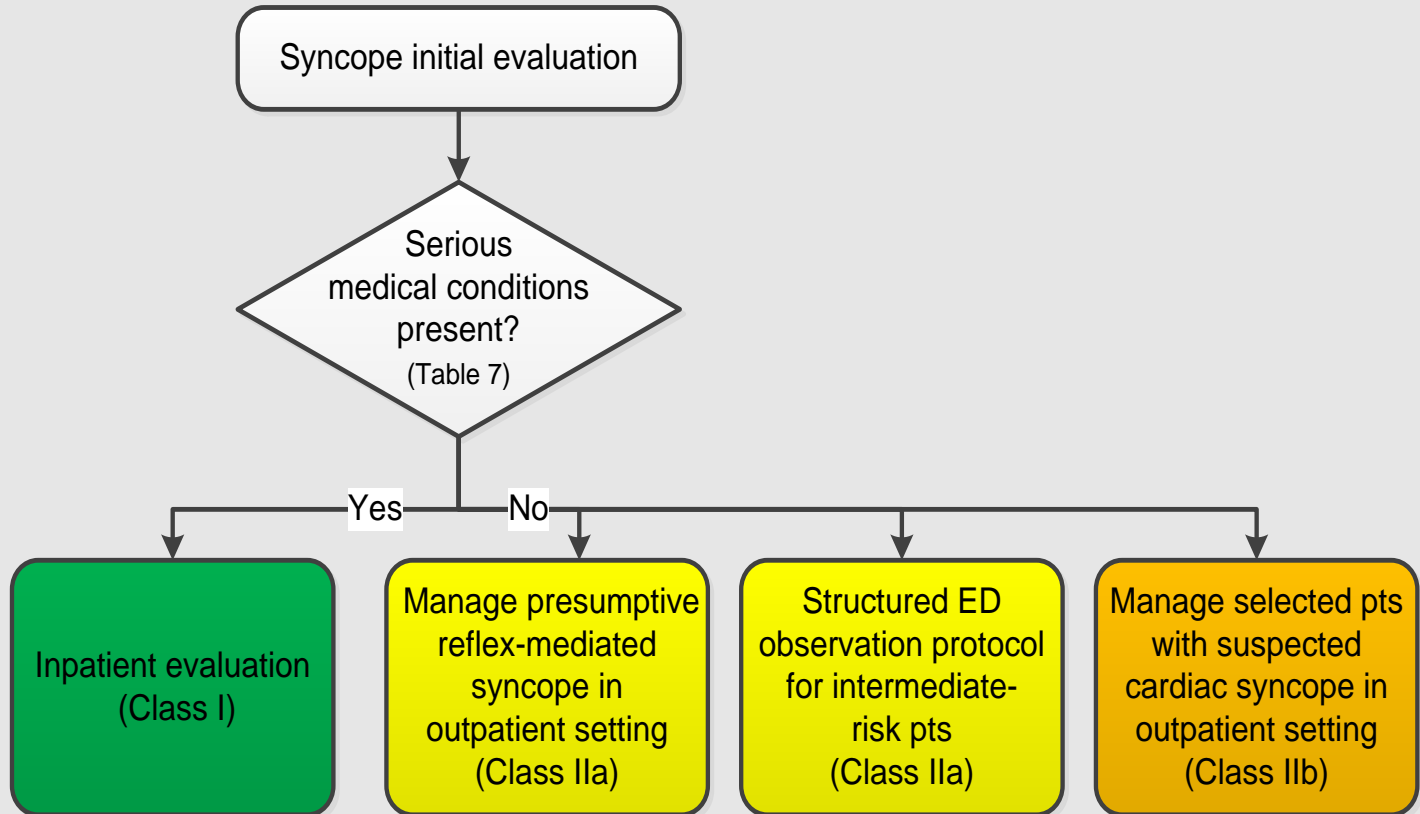
- Sympathetic
- Parasympathetic
- Baroreceptors

General Principles

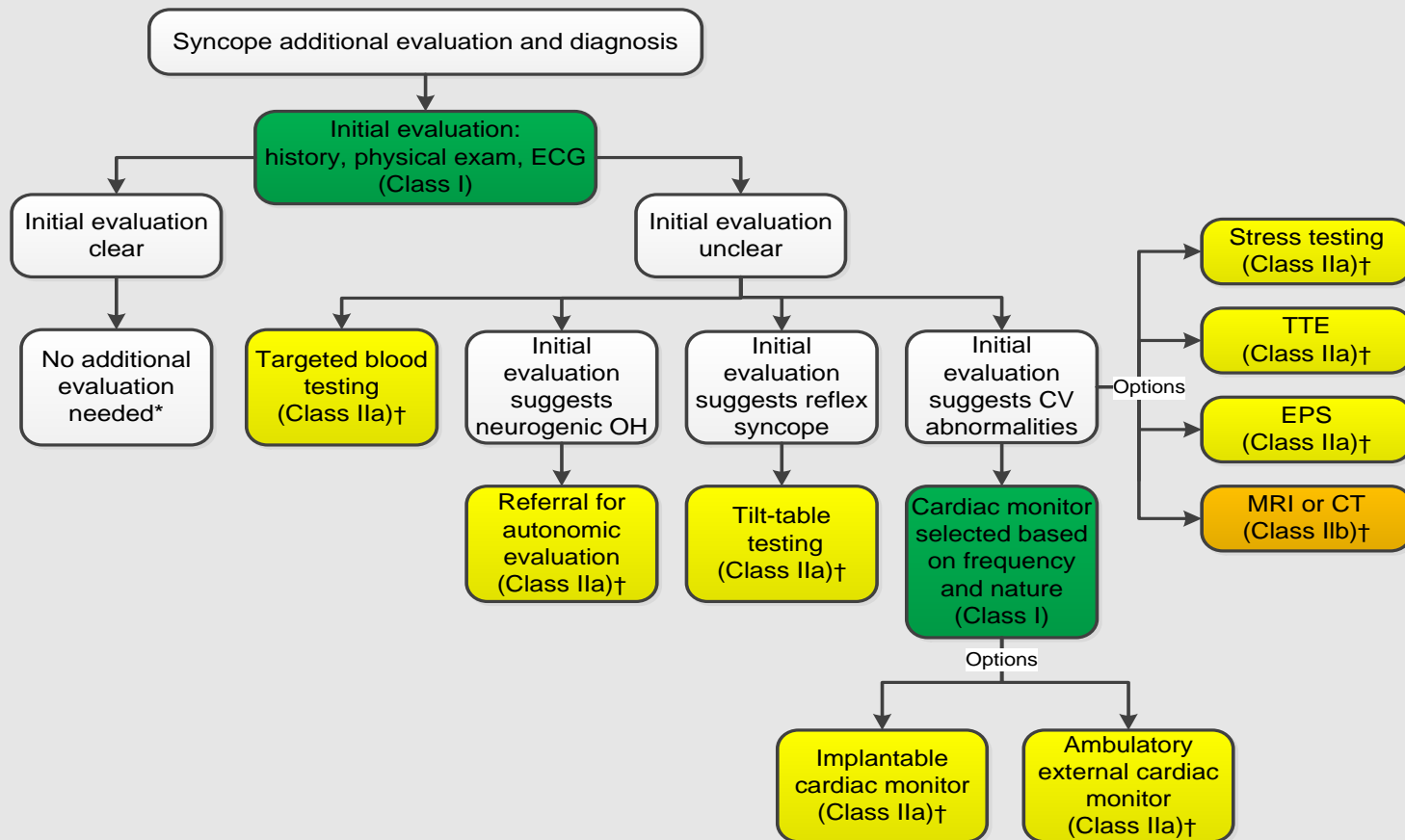
Syncope Initial Evaluation



Patient Disposition After Initial Evaluation for Syncope



Additional Evaluation and Diagnosis



Tilt-Table Testing

COR	LOE	Recommendations
Ila	B-R	If the diagnosis is unclear after initial evaluation, tilt-table testing can be useful for patients with suspected VVS.
Ila	B-NR	Tilt-table testing can be useful for patients with syncope and suspected delayed OH when initial evaluation is not diagnostic.
Ila	B-NR	Tilt-table testing is reasonable to distinguish convulsive syncope from epilepsy in selected patients.
Ila	B-NR	Tilt-table testing is reasonable to establish a diagnosis of pseudosyncope.
III: No Benefit	B-R	Tilt-table testing is not recommended to predict a response to medical treatments for VVS.

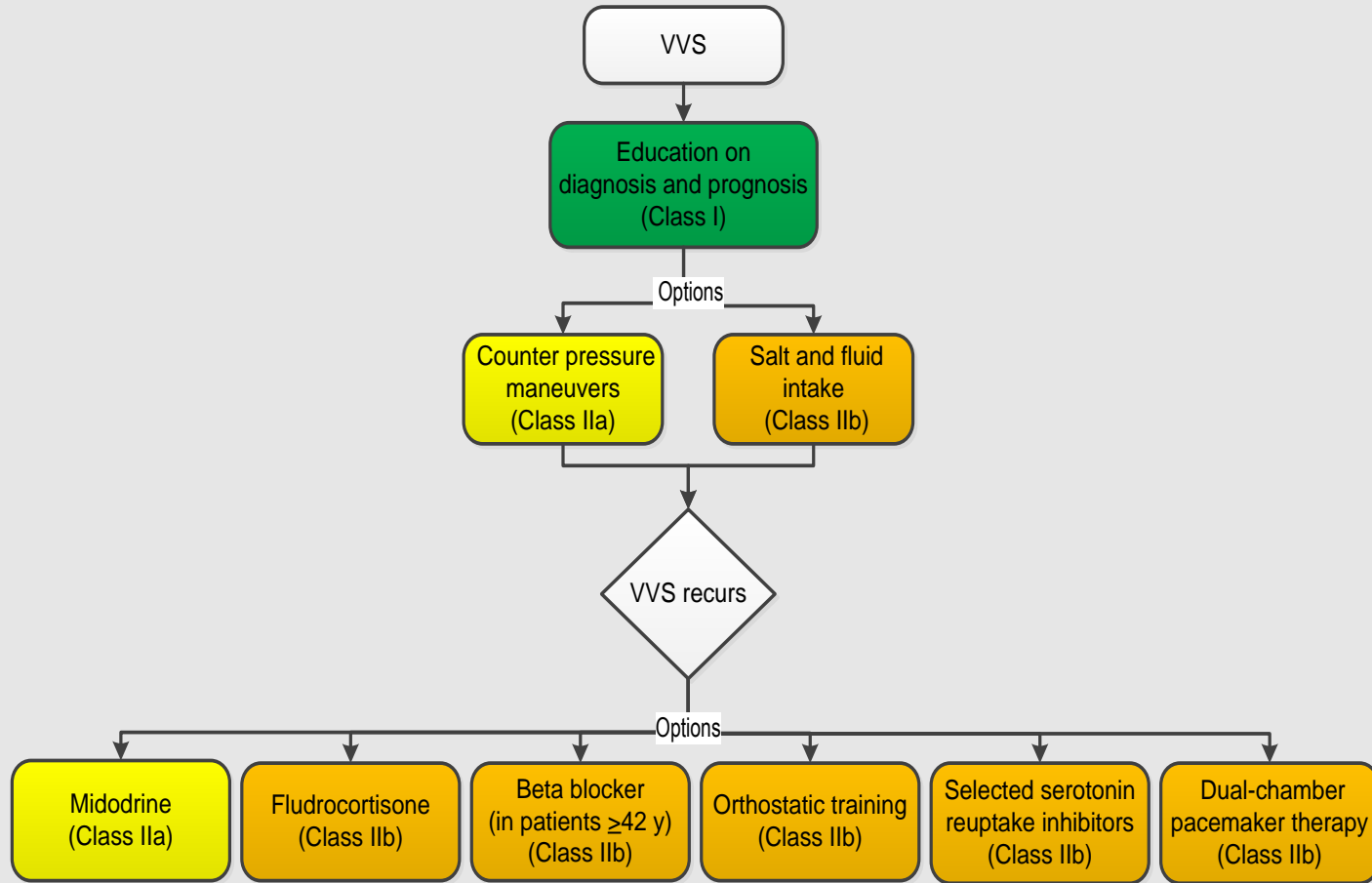
Neurological Testing

Autonomic Evaluation

COR	LOE	Recommendation
IIa	C-LD	Referral for autonomic evaluation can be useful to improve diagnostic and prognostic accuracy in selected patients with syncope and known or suspected neurodegenerative disease.

Vasovagal Syncope

Vasovagal Syncope



Reflex Conditions

Vasovagal Syncope

COR	LOE	Recommendations
I	C-EO	Patient education on the diagnosis and prognosis of VVS is recommended.
IIa	B-R	Physical counter-pressure maneuvers can be useful in patients with VVS who have a sufficiently long prodromal period.
IIa	B-R	Midodrine is reasonable in patients with recurrent VVS with no history of hypertension, HF, or urinary retention.
IIb	B-R	The usefulness of orthostatic training is uncertain in patients with frequent VVS.
IIb	B-R	Fludrocortisone might be reasonable for patients with recurrent VVS and inadequate response to salt and fluid intake, unless contraindicated.

Vasovagal Syncope (cont.)

IIb	B-NR	Beta blockers might be reasonable in patients 42 years of age or older with recurrent VVS.
IIb	C-LD	Encouraging increased salt and fluid intake may be reasonable in selected patients with VVS, unless contraindicated.
IIb	C-LD	In selected patients with VVS, it may be reasonable to reduce or withdraw medications that cause hypotension when appropriate.
IIb	C-LD	In patients with recurrent VVS, a selective serotonin reuptake inhibitor might be considered.

Pacemakers in Vasovagal Syncope

COR	LOE	Recommendation
IIb	B-R SR	Dual-chamber pacing might be reasonable in a select population of patients 40 years of age or older with recurrent VVS and prolonged spontaneous pauses.

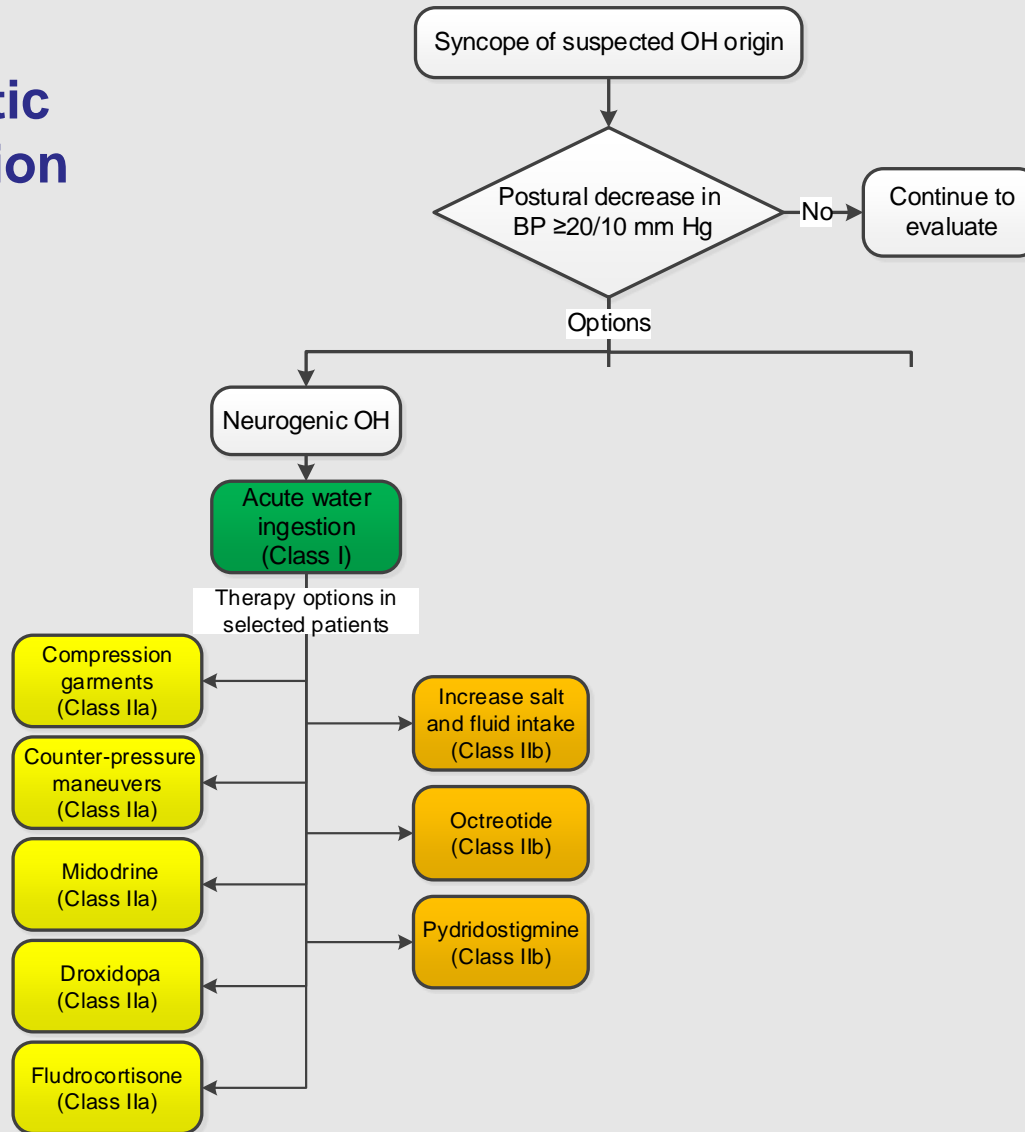
SR indicated systematic review.

Carotid Sinus Syndrome

COR	LOE	Recommendations
IIa	B-R	Permanent cardiac pacing is reasonable in patients with carotid sinus syndrome that is cardioinhibitory or mixed.
IIb	B-R	It may be reasonable to implant a dual-chamber pacemaker in patients with carotid sinus syndrome who require permanent pacing.

Orthostatic Hypotension

Orthostatic Hypotension



Colors correspond to Class of Recommendation in Table 1.
BP indicates blood pressure; OH, orthostatic hypotension.

Orthostatic Hypotension

Neurogenic Orthostatic Hypotension

COR	LOE	Recommendations
I	B-R	Acute water ingestion is recommended in patients with syncope caused by neurogenic OH for occasional, temporary relief.
IIa	C-LD	Physical counter-pressure maneuvers can be beneficial in patients with neurogenic OH with syncope.
IIa	C-LD	Compression garments can be beneficial in patients with syncope and OH.
IIa	B-R	Midodrine can be beneficial in patients with syncope due to neurogenic OH.
IIa	B-R	Droxidopa can be beneficial in patients with syncope due to neurogenic OH.

Neurogenic Orthostatic Hypotension (cont.)

IIa	C-LD	Fludrocortisone can be beneficial in patients with syncope due to neurogenic OH.
IIb	C-LD	Encouraging increased salt and fluid intake may be reasonable in selected patients with neurogenic OH.
IIb	C-LD	Pyridostigmine may be beneficial in patients with syncope due to neurogenic OH who are refractory to other treatments.
IIb	C-LD	Octreotide may be beneficial in patients with syncope and refractory recurrent postprandial or neurogenic OH.

Dehydration and Drugs

COR	LOE	Recommendations
I	C-LD	Fluid resuscitation via oral or intravenous bolus is recommended in patients with syncope due to acute dehydration.
IIa	B-NR	Reducing or withdrawing medications that may cause hypotension can be beneficial in selected patients with syncope.
IIa	C-LD	In selected patients with syncope due to dehydration, it is reasonable to encourage increased salt and fluid intake.

Driving and Syncope

COR	LOE	Recommendation
IIa	C-EO	It can be beneficial for healthcare providers managing patients with syncope to know the driving laws and restrictions in their regions and discuss implications with the patient.

TABLE 10

Avoidance of Private Driving After an Episode of Syncope: Suggested Symptom-Free Waiting Times for Various Conditions

Condition	Symptom-Free Waiting Time*
OH	1 month
VVS, no syncope in prior year (698)	No restriction
VVS, 1-6 syncope per year (694)	1 month
VVS, >6 syncope per year (694,698)	Not fit to drive until symptoms resolved
Situational syncope other than cough syncope	1 month
Cough syncope, untreated	Not fit to drive
Cough syncope, treated with cough suppression	1 month
Carotid sinus syncope, untreated (698)	Not fit to drive
Carotid sinus syncope, treated with permanent pacemaker (698)	1 week
Syncope due to nonreflex bradycardia, untreated (698)	Not fit to drive
Syncope due to nonreflex bradycardia, treated with permanent pacemaker (12,698)	1 week
Syncope due to SVT, untreated (698)	Not fit to drive
Syncope due to SVT, pharmacologically suppressed (698)	1 month
Syncope due to SVT, treated with ablation (698)	1 week
Syncope with LVEF <35% and a presumed arrhythmic etiology without an ICD (699,700)	Not fit to drive
Syncope with LVEF <35% and presumed arrhythmic etiology with an ICD (701,702)	3 months
Syncope presumed due to VT/VF, structural heart disease, and LVEF \geq 35%, untreated	Not fit to drive
Syncope presumed due to VT/VF, structural heart disease, and LVEF \geq 35%, treated with an ICD and guideline-directed drug therapy (701,702)	3 months
Syncope presumed due to VT with a genetic cause, untreated	Not fit to drive
Syncope presumed due to VT with a genetic cause, treated with an ICD or guideline-directed drug therapy	3 months
Syncope presumed due to a nonstructural heart disease VT, such as RVOT or LVOT, untreated	Not fit to drive
Syncope presumed due to a nonstructural heart disease VT, such as RVOT or LVOT, treated successfully with ablation or suppressed pharmacologically (698)	3 months
Syncope of undetermined etiology	1 month

*It may be prudent to wait and observe for this time without a syncope spell before resuming driving.

ICD indicates implantable cardioverter-defibrillator; LVEF, left ventricular ejection fraction; LVOT, left ventricular outflow tract; OH, orthostatic hypotension; RVOT, right ventricular outflow tract; SVT, supraventricular tachycardia; VF, ventricular fibrillation; VT, ventricular tachycardia; and VVS, vasovagal syncope.

Athletes

COR	LOE	Recommendations
I	C-EO	Cardiovascular assessment by a care provider experienced in treating athletes with syncope is recommended prior to resuming competitive sports.
IIa	C-LD	Assessment by a specialist with disease-specific expertise is reasonable for athletes with syncope and high-risk markers.
IIa	C-LD	Extended monitoring can be beneficial for athletes with unexplained exertional syncope after an initial cardiovascular evaluation.
III: Harm	B-NR	Participation in competitive sports is not recommended for athletes with syncope and phenotype-positive HCM, CPVT, LQTS1, or ARVC before evaluation by a specialist.

POTS

Postural Orthostatic Tachycardia Syndrome Definition:

Postural orthostatic tachycardia syndrome (POTS) is defined as a clinical syndrome lasting at least 6 months that is characterized by:

- 1) an increase in heart rate ≥ 30 bpm within 5 to 10 min of quiet standing or upright tilt (or ≥ 40 bpm in individuals 12 to 19 years of age);
- 2) the absence of orthostatic hypotension (>20 mm Hg drop in systolic blood pressure); and
- 3) frequent symptoms that occur with standing such as lightheadedness, palpitations, tremulousness, generalized weakness, blurred vision, exercise intolerance, and fatigue.

Meredith Bryarly et al. JACC 2019;73:1207-1228

	POTS	ORTHOSTATIC HYPOTENSION	VAGOVAGAL SYNCOPE
BLOOD PRESSURE	No change	Down >20 mm Hg	down
PULSE	Up >30 bpm	Up >10 bpm	down

<p>Avoid Situations That Can Exacerbate Symptoms</p>	<p>Liberal Intake of Salt and Water</p>	<p>Sleep With Head of Bed Elevated</p>
 <p>Large/Heavy Meals</p> <p>Heat Exposure</p> <p>Alcohol Intake</p>		 <p>Head posts should be elevated 4-6 inches</p>
<p>Use of Compression Garments</p>	<p>Physical Counter Maneuvers</p>	<p>Drinking Water Before Getting Up In The Morning</p>
 <p>Abdominal Binder</p> <p>Hose</p>	 <p>Leg Crossing Maneuver</p> <p>Squatting</p>	 <p>Drinking a 16 oz glass of water quickly before getting out of bed in the morning or prolonged standing to minimize orthostatic symptoms</p>
<p>Strategies to Avoid Upright Exercise</p>		
 <p>Seated Rower</p>	 <p>Swimming</p>	 <p>Recumbant Bicycle</p>

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