REVIEW ARTICLE

Syncope: diagnosis and management according to the 2009 guidelines of the European Society of Cardiology

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KEY WORDS

syncope diagnosis, syncope treatment

ABSTRACT

The European Society of Cardiology has recently revised its guidelines on the diagnosis and management of syncope. This document is a synopsis of their recommendations.

Definition Syncope is a transient loss of consciousness (T-LOC) due to transient global cerebral hypoperfusion characterized by rapid onset, short duration, and spontaneous complete recovery.[1] Clinical approach to syncope is presented in FIGURE 1, and classification of syncope in TABLE 1.

Epidemiology Syncope is common in the general population but only a small fraction of patients with syncope seek medical attention. Reflex syncope is the most frequent etiology, especially in the young. Syncope secondary to cardiovascular disease is the second most common cause with higher frequencies in emergency presentations, mainly in older subjects and in cardiological settings. Syncope secondary to orthostatic hypotension (OH) is rare in patients aged <40 years and is frequent in very old subjects.

Prognosis and quality of life Structural heart disease is the major risk factor for sudden cardiac death and overall mortality in syncope. The number of episodes of syncope during the patient's life and during the previous year is a strong predictor of recurrence. Mortality is high in the elderly. Recurrent syncope is seriously prejudicial to quality of life.

Initial evaluation The initial evaluation of a patient presenting with T-LOC consists of a careful history, physical examination, including blood pressure (BP) measurement and standard electrocardiogram (ECG). Based on the findings additional investigations may be indicated:

1 carotid sinus massage (CSM) in patients aged >40 years
2 echocardiogram when there is evidence of structural heart disease
3 immediate ECG monitoring on suspicion of arrhythmic syncope
4 active standing test or head-up tilt test when syncope is prompted by upright posture or is thought to be reflex
5 other tests when T-LOC is considered not to be syncope.

TABLE 1 Classification of syncope

reflex (neurally-mediated) syncope
vasovagal
situational
carotid sinus syndrome
atypical forms without apparent triggers and/or atypical presentation
orthostatic hypotension
primary autonomic failure
secondary autonomic failure
drug-induced
volume depletion
cardiovascular
arrhythmia
structural cardiovascular disease

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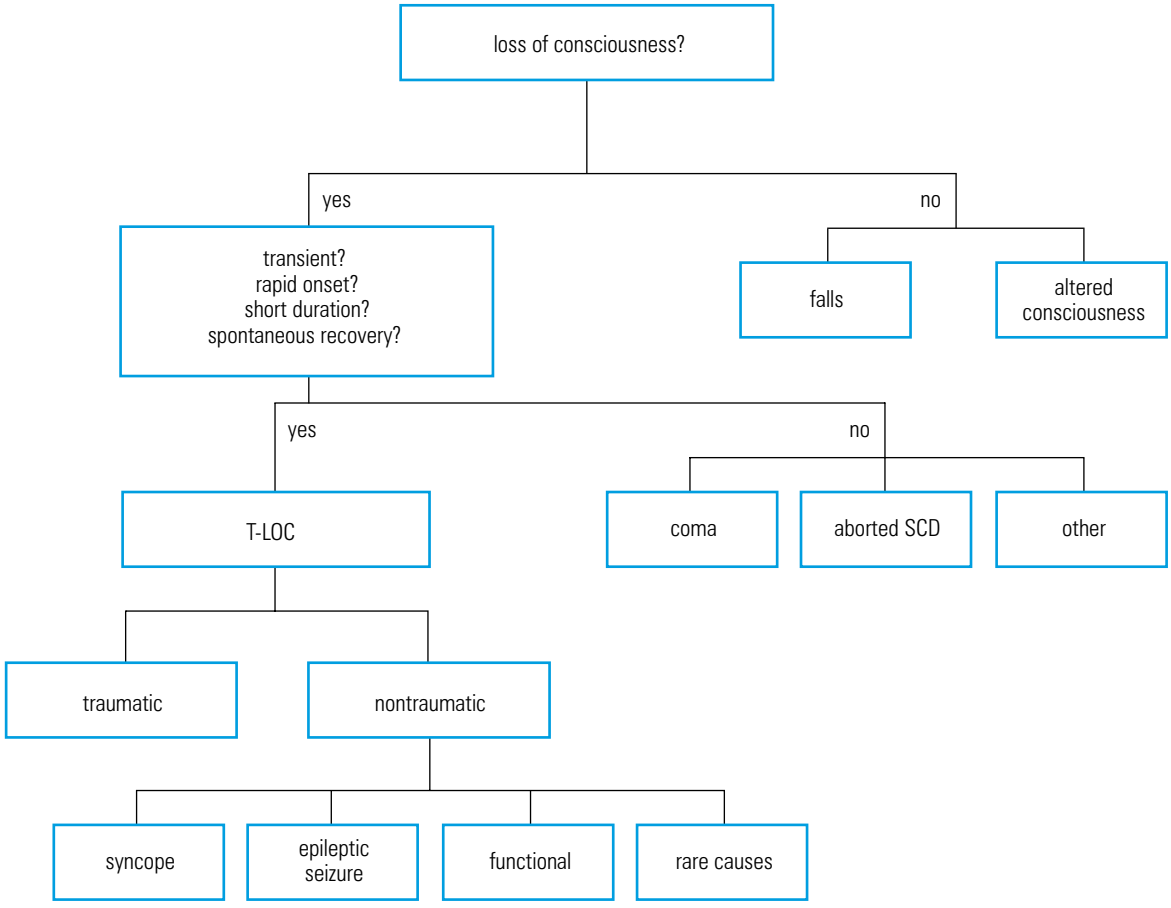

FIGURE 1 Clinical approach to syncope
Abbreviations: SCD – sudden cardiac death, T-LOC – transient loss of consciousness

The initial evaluation should answer 3 key questions:

1 Is the episode syncope or not?
2 Has the etiology been determined?
3 Is there a suggestion of high risk of cardiovascular events or death?

Risk stratification Short-term, high-risk criteria, which require prompt hospitalization or intensive evaluation, are listed below:

1 severe structural or coronary artery disease (heart failure, low left ventricular ejection fraction or previous myocardial infarction)
2 clinical or ECG features suggesting arrhythmic syncope:
- **a** syncope during exertion or supine
- **b** palpitations at the time of syncope
- **c** bifascicular block (left bundle branch block [BBB] or right BBB with left anterior or posterior hemiblock or QRS >120 ms)
- **d** sinus bradycardia (<40 bpm) or sinoatrial block in the absence of negatively chronotropic drugs or physical training
- **e** pre-excited QRS
- **f** prolonged or short QT interval
- **g** ST-elevation in ECG leads V1–3 (Brugada pattern)
- **h** negative T waves in right precordial leads, epsilon waves and ventricular late potentials suggesting arrhythmogenic right ventricular cardiomyopathy

3 family history of sudden death
4 important comorbidities
- **a** severe anemia
- **b** electrolyte disturbance

FIGURE 2 shows a flowchart for diagnosis in syncope.

Clinical features of syncope at initial evaluation suggesting a diagnosis In neurally-mediated (or reflex) syncope:

1 long history
2 triggered by unpleasant sights, smells or by pain
3 prolonged standing
4 association of nausea or vomiting
5 during or after a meal
6 precipitated by head rotation
7 after exertion.

In OH:

1 on standing up
2 related to commencing or increasing dosage of vasodilator medication
3 presence of autonomic neuropathy or Parkinson's disease.

In cardiac disease:

1 presence of structural heart disease
2 family history of sudden death or known channelopathy

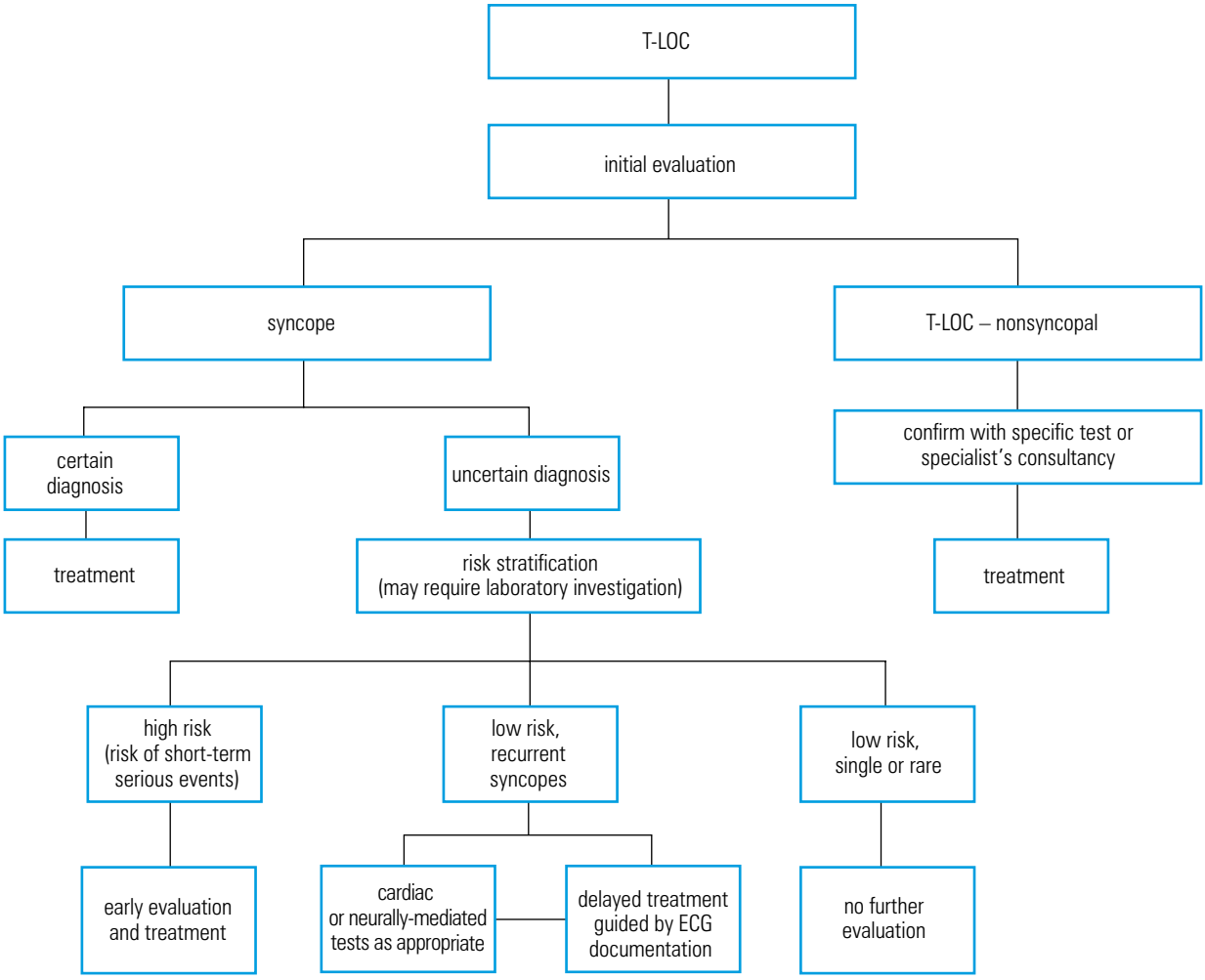

FIGURE 2 Flowchart for diagnosis in syncope
Abbreviations: ECG – electrocardiogram, others – see FIGURE 1

3 during exertion or supine
4 abnormal ECG
5 sudden palpitation leading to syncope
6 suggestive ECG findings are:
a as for arrhythmic syncope plus
b Mobitz 1 second degree atrioventricular (AV) block
c asymptomatic sinus bradycardia <50 bpm
d Q waves suggesting myocardial infarction.

Diagnostic criteria for arrhythmic and cardiovascular syncope Vasovagal syncope is diagnosed when syncope is precipitated by emotion, prolonged standing, dehydration, and there is a typical prodrome. Situational syncope is diagnosed when it occurs in close proximity to a specific trigger such as cough, micturition, etc. Arrhythmic syncope is diagnosed when ECG criteria are present (see above). Additionally, nonsustained ventricular tachycardia and evidence of pacemaker or implantable defibrillator malfunction with cardiac pauses are also included. Cardiovascular syncope is diagnosed in the presence of acute ischemia with or without infarction and in those with evidence of left atrial myxoma, severe aortic stenosis, pulmonary hypertension, or acute aortic dissection.

Diagnostic tests of value in further evaluation of syncope CSM is indicated in patients with syncope aged >40 years but it should be avoided in those who have sustained a myocardial infarction in the last 3 months and in the presence of carotid bruits unless Doppler studies have shown no significant arterial stenosis. Carotid sinus syndrome (CSS) is diagnosed if massage causes >3s asystole or a fall in BP >50 mmHg with reproduction of symptoms. Massage should be performed both supine and erect.

Active standing test is indicated in patients with severe dizziness or syncope in the first 3 min of adopting erect position. BP is measured repeatedly by cuff for at least 3 min. A diagnosis of OH is made when systolic BP falls >20 mmHg or to <90 mmHg or diastolic BP falls >10 mmHg from baseline. These criteria are considered diagnostic whether there are symptoms or not.

Tilt testing Method The patient is supine for 5 min before tilt-up (20 min if a vein is cannulated), then tilted head-up at 60–70 degrees for 20 min (maximum 45 min), if no event tilt is continued for a further 15 min commencing with the administration of nitroglycerine 400 mcg sublingually. If isoproterenol is given as an alternative to nitroglycerine, 1

TABLE 2 Syncope and driving

Diagnosis	Private drivers	Vocational drivers
arrhythmias medical therapy	after successful treatment established	after successful treatment established
pacemaker implant	after 1 week	after correct function etablished
catheter ablation	after successful treatment established	after long-term success confirmed
implantable cardioverter defibrillator	in general low-risk restriction case-by-case	restriction permanent
single/mild reflex syncope	no restriction	no restriction unless occurrence during high risk activity
recurrent/severe syncope	after symptoms controlled	permanent restriction unless effective therapy established
unexplained syncope	no restriction unless absence of prodrome, occurrence during driving or presence of severe structural heart disease	after diagnosis and appropriate therapy established

mcg/min is given intravenously for 5 min increasing by 1 mcg/min to 3 mcg/min in order to raise the heart rate by 25% above baseline. The end-point of the test is either syncope (positive) or conclusion of the protocol without syncope (negative).

Indications Tilt testing is employed in patients with recurrent syncope, no structural heart disease or in those with a single episode at high risk of consequences at a future recurrence. Tilt testing is undertaken when it is considered of value to demonstrate to the patient the nature of the syncope. Tilt testing is of value in separating reflex syncope from OH and from epilepsy when abnormal movements have been observed in an attack. Tilt testing is also valuable in the investigation of recurrent unexplained falls and in patients with very frequent syncope when attacks may be psychogenic. Tilt testing is not recommended for assessment of treatment as it has been found unreliable and use of isoproterenol is contraindicated in ischemic heart disease.

Diagnostic criteria Reflex syncope in patients without structural heart disease may be diagnosed in the presence of hypotension ± bradycardia after >3 min stability of these parameters from tilt-up and, at the same time, the patient's usual symptoms are reproduced. OH is diagnosed when the criteria stated above are present. Negative tilt tests do not exclude reflex syncope. In patients with structural heart disease, cardiovascular causes of syncope must be excluded before a diagnosis of reflex syncope can be made from a positive tilt test. Induction of apparent syncope without fall in BP or heart rate is diagnostic of psychogenic pseudosyncope.

ECG monitoring Monitoring of the ECG should be undertaken in any patient suspected of arrhythmic syncope. The method of monitoring depends on the patient's presentation. High-risk patients require in-hospital assessment. Holter monitoring is only appropriate in patients who have frequent symptoms. An implantable loop recorder (ILR) is advised for use early in evaluation of patients with recurrent syncope unexplained by the initial evaluation. Evidence suggests that this approach yields more precise information about spontaneous attacks than that available from induced syncope on the tilt table. This includes assessment of the contribution of bradycardia to reflex syncope in older patients. External loop recorders are only an alternative to ILRs when symptoms occur at a rate of >2/month as patient tolerance of these devices is often poor.

Diagnostic criteria The correlation of spontaneous syncope with a documented arrhythmia is diagnostic of the patient's mechanism of syncope. In the absence of syncope, mechanism of syncope can be diagnosed with ECG documentation of Mobitz 2 AV block, complete heart block, a ventricular pause of >3 s (except in athletes, during sleep, in presence of negatively chronotropic drugs and in rate-controlled atrial fibrillation) and rapid supra- and ventricular tachycardia. Other asymptomatic arrhythmias are not diagnostic of the mechanism of syncope including sinus bradycardia. A finding of no rhythm disturbance during syncope excludes a diagnosis of arrhythmic syncope. ECG documentation of presyncope is not an accurate surrogate for syncope.

Electrophysiological study Electrophysiological study is only indicated in the presence of structural heart disease. The method employed depends on the findings on both initial evaluation and ECG monitoring. Diagnostic criteria are available in the published guidelines.

Echocardiography Echocardiography is valuable in the assessment of structural heart disease but only makes a diagnosis in aortic stenosis, obstructive cardiac tumours or thrombi, pericardial tamponade, aortic dissection, and congenital abnormalities of the coronary arteries.

Exercise testing Exercise testing is valuable in patients whose syncope occurs during or shortly after exercise. It is diagnostic when syncope is reproduced and there are rhythm disturbances and/or hypotension. It is also diagnostic, without syncope, if Mobitz 2 AV block or complete heart block is precipitated.

Psychiatric evaluation Psychiatric evaluation is helpful in patients with frequent syncope and tilt

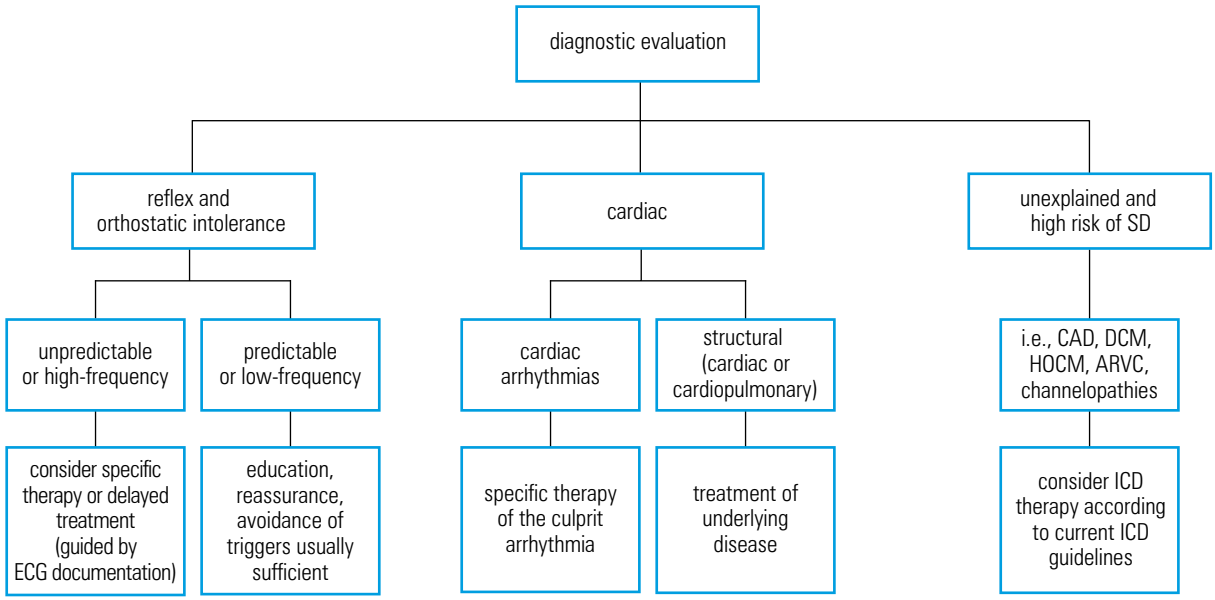

FIGURE 3 Syncope treatment

Abbreviations: ARVC – arrhythmogenic right ventricular cardiomyopathy, CAD – coronary artery disease, DCM – dilated cardiomyopathy, HOCM – hyperthropic cardiomyopathy, ICD – implanable cardioverter defibrillator, SD – sudden death, others – see FIGURE 2

testing has demonstrated apparent loss of consciousness without falls in BP and heart rate.

Neurological evaluation Neurological evaluation is recommended in patients suspected of having epilepsy; in those whose symptoms of OH suggest autonomic failure.

EEG and brain scans (computed tomography or magnetic resonance) These tests are not recommended unless the loss of consciousness is suspected not to be syncope.

Syncope treatment is presented in FIGURE 3.

Treatment of reflex syncope The mainstays of treatment of reflex syncope are explanation and reassurance, avoidance of triggers and situations, which may induce syncope, modification of any hypotensive drug regimen, use of isometric maneuvers as physical counter-measures to combat falling BP during a prodrome.

In CSS with cardioinhibition, dual chamber pacing has been shown to be helpful in prevention of recurrent syncope. In reflex syncope in patients aged >40, documentation of severe bradycardia or asystole in a spontaneous attack (or also on tilt-testing) should prompt consideration of dual chamber pacing. Midodrine, an α agonist, may be helpful in reducing reflex syncope. No other drug has any clinical trial evidence in its favor for this indication. Pacing is contraindicated in the absence of severe cardioinhibition.

Treatment of orthostatic hypotension Triggers and precipitating situations should be avoided. Adequate hydration and salt intake must be maintained. Hypotensive medication must be modified or discontinued. Medication with fludrocortisone or midodrine is indicated, if tolerated. Physical counter-measures are helpful but may be limited in effect by the lack of muscle bulk in the elderly. Abdominal binders and/or full-length support stockings may also be helpful. Sleeping in a bed, raised by >10 degrees at the head, may help to condition the body for the upright posture as well as ameliorate nocturnal hypertension.

Treatment of cardiac arrhythmia Pacing is indicated in sinus node disease and AV block according to the guidelines on pacing. Ablation and antiarrhythmic drug therapy are also indicated in patients according to the guidelines. Implantable cardioverter defibrillators are indicated in patients with ventricular tachyarrhythmias according to the guidelines for these devices.

Syncope in the elderly The most common causes of syncope in the elderly are OH, CSS, reflex syncope, and cardiac arrhythmias. Different forms may often coexist in the same patient.

Important points in evaluation of syncope in the elderly:

1 OH is not always reproducible (particularly medication related); assessment may have to be repeated in the morning or after spontaneous syncope.

2 CSM is particularly useful in this age group.

3 In reflex syncope in older patients tilt testing is safe and well tolerated with positive rates similar to those in the young. Nitroglycerine challenge may be needed. Induced syncope may be unrecognized by the patient. Prodrome may be absent.

4 24-hour ambulatory BP is indicated, if fluctuation of BP is suspected (e.g., nocturnal hypertension or postprandial hypotension).

5 ILR is very valuable as incidence of arrhythmias is high.

6 Evaluation of mobile, independent, cognitively normal elderly subjects must be performed as for the young.

Syncope in children Diagnostic evaluation in pediatric patients is similar to that in adults. Reflex syncope represents the vast majority of the causes but in rare cases syncope is a manifestation of life-threatening arrhythmia or structural abnormality. Syncope must also be differentiated from epilepsy and psychogenic pseudosyncope, which are rare but important causes of T-LOC in this age group. Some aspects of the history should prompt cardiac evaluation:

1 family history of sudden cardiac death (<30 years), familial heart disease

2 known or suspected heart disease

3 syncope triggers: loud noise, fright, extreme emotional stress

4 syncope during exercise, including swimming

5 syncope without prodrome, while supine or sleeping or preceded by chest pain or palpitations.

Syncope management unit **Objectives** Any syncope or T-LOC facility has the following goals:

1 Provide state-of-the-art guideline-based assessment of symptomatic patients in order to risk-stratify them, then obtain an accurate etiological diagnosis and assess prognosis.

2 Physician(s) in the unit lead the process of comprehensive management from diagnosis to therapy and may also offer follow-up. Core tests are provided within the unit and there is preferential access to other diagnostic tests and therapies.

3 Reduce hospitalizations. The majority of patients can be managed as outpatients or day cases.

4 Set standards for clinical excellence in adherence to the current guidelines on syncope.

Key points for standardized care delivery:

1 A structured care pathway, either delivered in a single facility or as a more multi-faceted service is recommended for global assessment of patients with T-LOC.

2 Experience and training in cardiology, neurology, geriatrics, pediatrics, and emergency medicine are pertinent to this facility.

REFERENCES

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ARTYKUŁ POGLĄDOWY

Omdlenia – diagnostyka i leczenie według wytycznych 2009 European Society of Cardiology

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SŁOWA KLUCZOWE

diagnostyka omdleń, leczenie omdleń

STRESZCZENIE

European Society of Cardiology zaktualizowało niedawno swoje wytyczne dotyczące diagnostyki i leczenia omdleń. Niniejsze opracowanie stanowi podsumowanie tych zaleceń.

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