SYNKOPA

Doporučené postupy
pro diagnostiku a léčbu

M. Táborský
27.11.2015

EHRA
KEY MESSAGES

Syncope series

EHRA Consensus Document on Syncope Unit: Rationale and Requirement

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ESC GUIDELINES

Guidelines for the diagnosis and management of syncope (version 2009)

The Task Force for the Diagnosis and Management of Syncope of the European Society of Cardiology (ESC)

Developed in collaboration with, European Heart Rhythm Association (EHRA)[1], Heart Failure Association (HFA)[2], and Heart Rhythm Society (HRS)[3]

Endorsed by the following societies, European Society of Emergency Medicine (EuSEM)[4], European Federation of Internal Medicine (EFIM)[5], European Union Geriatric Medicine Society (EUGMS)[6], American Geriatrics Society (AGS), European Neurological Society (ENS)[7], European Federation of Autonomic Societies (EFAS)[8], American Autonomic Society (AAS)[9]

Authors/Task Force Members, Angel Moya (Chairperson) (Spain)*, Richard Sutton (Co-Chairperson) (UK)*, Fabrizio Ammirati (Italy), Jean-Jacques Blanc (France), Michele Brignole[1] (Italy), Johannes B. Dahm (Germany), Jean-Claude Deharo (France), Jacek Gajek (Poland), Knut Gjesdal[2] (Norway), Andrew Krahn[3] (Canada), Martial Massin (Belgium), Mauro Pepi (Italy), Thomas Pezawas (Austria), Ricardo Ruiz Granell (Spain), Francois Sarasin[4] (Switzerland), Andrea Ungar[6] (Italy), J. Gert van Dijk[7] (The Netherlands), Edmond P. Walma (The Netherlands), Wouter Wieling (The Netherlands)

External Contributors, Haruhiko Abe (Japan), David G. Benditt (USA), Wyatt W. Decker (USA), Blair P. Grubb (USA), Horacio Kaufmann[9] (USA), Carlos Morillo (Canada), Brian Olshansky (USA), Steve W. Parry (UK), Robert Sheldon (Canada), Win K. Shen (USA)

ESC Committee for Practice Guidelines (CPG), Alec Vahanian (Chairperson) (France), Angelo Auricchio (Switzerland), Jeroen Bax (The Netherlands), Claudio Ceconi (Italy), Veronica Dean (France), Gerasimos Filippatos (Greece), Christian Funck-Brentano (France), Richard Hobbs (UK), Peter Kearney (Ireland), Theresa McDonagh (UK), Keith McGregor (France), Bogdan A. Popescu (Romania), Zeljko Reiner (Croatia), Udo Sechtem (Germany), Per Anton Sirnes (Norway), Michal Tendera (Poland), Panos Vardas (Greece), Petr Widimsky (Czech Republic)

Document Reviewers, Angelo Auricchio (CPG Review Coordinator) (Switzerland), Esmeray Acarturk (Turkey), Felicita Andreotti (Italy), Riccardo Asteggiano (Italy), Urs Bauersfeld (Switzerland), Abdelouahab Bellou[4] (France), Athanase Benetos[6] (France), Johan Brandt (Sweden), Mina K. Chung[3] (USA), Pietro Cortelli[8] (Italy), Antoine Da Costa (France), Fabrice Extramiana (France), José Ferro[7] (Portugal), Bulent Gorenek (Turkey), Antti Hedman (Finland), Rafael Hirsch (Israel), Gabriela Kaliska (Slovak Republic), Rose Anne Kenny[6] (Ireland), Keld Per Kjeldsen (Denmark), Rachel Lampert[3] (USA), Henning Mølgard (Denmark), Rain Paju (Estonia), Aras Puodziukynas (Lithuania), Antonio Raviele (Italy), Pilar Roman[5] (Spain), Martin Scherer (Germany), Ronald Schondorf[9] (Canada), Rosa Sicari (Italy), Peter Vanbrabant[4] (Belgium), Christian Wolpert[1] (Germany), Jose Luis Zamorano (Spain)

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Update 2012

New Concepts in the Assessment of Syncope

Michele Brignole, MD,* Mohamed H. Hamdan, MD†

Lavagna, Italy; and Salt Lake City, Utah

Significant progress has been made in the past 3 decades in our understanding of the various causes of loss of consciousness thanks to the publication of several important studies and guidelines. In particular, the recent European Society of Cardiology guidelines provide a reference standard for optimal quality service delivery. This paper gives the reader brief guidance on how to manage a patient with syncope, with reference to the above guidelines. Despite the progress made, the management of patients with syncope remains largely unsatisfactory because of the presence of a significant gap between knowledge and its application. Two new concepts aimed at filling that gap are currently under evaluation: syncope facilities with specialist backup and interactive decision-making software. Preliminary data have shown that a standardized syncope assessment, especially when coupled with interactive decision-making software, decreases admission rate and unnecessary testing and improves diagnostic yield, thus reducing cost per diagnosis. The long-term effects of such a new health care model on the rate of diagnosis and survival await future studies. (J Am Coll Cardiol 2012;59:1583–91)

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Syncope Unit: EHRA/HRS

Syncope Unit: rationale and requirement – the European Heart Rhythm Association position statement endorsed by the Heart Rhythm Society

Rose Anne Kenny* (Chairperson, Ireland), Michele Brignole (Co-chairperson, Italy), Gheorghe-Andrei Dan (Romania), Jean Claude Deharo (France), J. Gert van Dijk (The Netherlands), Colin Doherty (Ireland), Mohamed Hamdan (USA), Angel Moya (Spain), Steve W. Parry (UK), Richard Sutton (UK), Andrea Ungar (Italy), and Wouter Wieling (The Netherlands)

External contributors to the Task Force: Mehran Asgari (UK), Gonzalo Baron-Esquivias (Spain), Jean-Jacques Blanc (France), Ivo Casagranda (Italy), Conal Cunnigham (Ireland), Artur Fedorowski (Sweden), Raffello Furlan (Italy), Nicholas Gall (UK), Frederik J. De Lange (The Netherlands), Geraldine Mcmahon (Ireland), Peter Mitro (Slovakia), Artur Pietrucha (Poland), Cristian Podoleanu (Romania), Antonio Raviele (Italy), David Benditt (USA), Andrew Krahn (Canada), Carlos Arturo Morillo (Canada), Brian Olshansky (USA), Satish Raj (USA), Robert Sheldon (Canada), Win Kuang Shen (USA), Benjamin Sun (USA), Denise Hachul (Brazil), Haruhiko Abe (Japan), and Toshyuki Furukawa (Japan)

Document reviewers: Review coordinators, Bulent Gorenek (Turkey), Gregory Y. H. Lip (UK), Michael Glikson (Israel), Philippe Ritter (France), Jodie Hurwitz (USA), Robert Macfadyen (Australia), Andrew Rankin (UK), Luis Mont (Spain), Jesper Svendsen (Denmark), Fred Kusumoto (USA), Mitchell Cohen (USA), and Irene Savelieva (on behalf of EP-Europace, UK)

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Definice synkopy:

- Synkopa je přechodná ztráta vědomí (Transient Loss of Consciousness - T-LOC) díky přechodné globální cerebrální hypoperfuzi charakterizovaná

  1. náhlým vznikem
  2. krátkou dobou trvání
  3. spontánní kompletní úpravou

Conditions incorrectly diagnosed as syncope

- **Disorders with partial or complete (LOC) but without cerebral hypoperfusion:**
  - Epilepsy,
  - Metabolic disorders including hypoglycemia, hypoxia, hyperventilation with hypocapnia,
  - Intoxication,
  - Vertebrobasilar TIA (Transient Ischemic Attack).

- **Disorders without impairment of consciousness:**
  - Cataplexy,
  - Drop attacks,
  - Falls,
  - Functional (psychogenic pseudosyncope),
  - TIA of carotid origin.

Classification of syncope

Reflex (neurally-mediated) syncope

Vasovagal:
- Mediated by emotional distress: fear, pain, instrumentation, blood phobia.
- Mediated by orthostatic stress.

Situational:
- Cough, sneeze.
- Gastrointestinal stimulation (swallow, defaecation, visceral pain).
- Micturition (post-micturition).
- Post-exercice.
- Post-prandial.
- Others (e.g., laught, brass instrument playing, weightlifting).

Carotid sinus syncope

Atypical forms (without apparent triggers and/or atypical presentation).

Syncope due to orthostatic hypotension

Primary autonomic failure:
- Pure autonomic failure, multiple system atrophy, Parkinson's disease with autonomic failure, Lewy body dementia.

Secondary autonomic failure:
- Diabetes, amyloidosis, uraemia, spinal cord injuries.

Drug-induced orthostatic hypotension:
- Alcohol, vasodilators, diuretics, phenotiazines, antidepressants.

Volume depletion:
- Haemorrhage, diarrhoea, vomiting, etc.

Cardiac syncope (cardiovascular)

Arrhythmia as primary cause:
Bradycardia:
- Sinus node disfunction (including brady-cardia/tachycardia syndrome).
- Atrioventricular conduction system disease.
- Implanted device malfunction.

Tachycardia:
- Supraventricular.
- Ventricular (idiopathic, secondary to structural heart disease or to channelopathies).

Drug induced bradycardia and tachyarrhythmias

Structural disease:

Cardiac: *cardiac valvular disease, acute myocardial infarction/ischaemia, hypertrophic cardiomyopathy, cardiac masses (atrial myxoma, tumors, etc), pericardial disease/tamponade, congenital anomalies of coronary arteries, prosthetic valves dysfunction.*

Others: *pulmonary embolus, acute aortic dissection, pulmonary hypertension.*

Nový koncept klasifikace synkop 2012

By etiology (clinical forms)	By mechanism (ECG/BP documentation)
Reflex (neurally-mediated) Vasovagal Situational Carotid sinus Atypical forms (tilt-positive)	**Bradycardia** Asystole Sinus arrest Sinus bradycardia plus AV block AV block Bradycardia (sinus)
Orthostatic hypotension Primary autonomic failure Secondary autonomic failure Drug-induced Volume depletion	**Tachycardia** Progressive sinus tachycardia Atrial fibrillation Atrial tachycardia (except sinus) Ventricular tachycardia
Cardiac or Cardiovascular Arrhythmia as primary cause Bradycardia Tachycardia Drug-induced Structural cardiac (e.g., aortic stenosis, atrial mixoma, etc)	**No or slight rhythm variations-(Hypotension)**

Figure Legend:

Classification of Syncope According to Etiology

AV = atrioventricular; BP = blood pressure; ECG = electrocardiogram; ESC = European Society of Cardiology; ISSUE = International Study on Syncope of Uncertain Etiology.
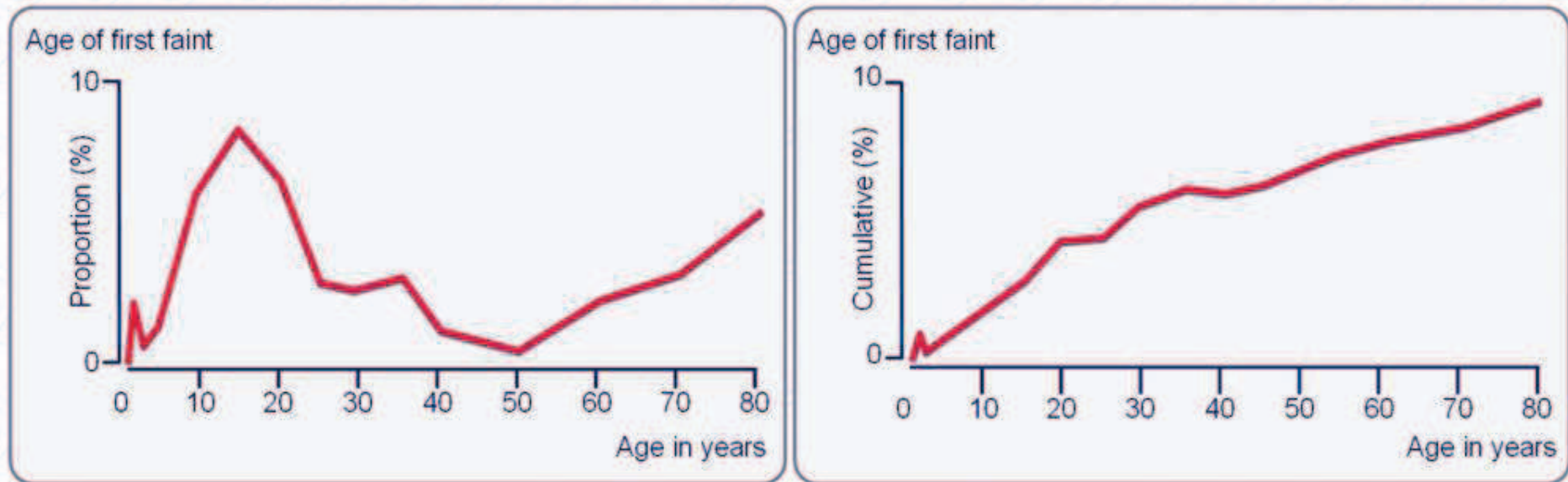
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Epidemiology

Schematic presentation of the distribution of age and cumulative incidence
of first episode of syncope in the general population from subjects
up to 80 years is shown.

Lombroso et al. *Pediatrics* 1967; Soteriades et al. *N Eng J Med* 2003
Ganzeboom et al. *Am J Cardiol* 2003

Frequency of the causes of syncope according to age

Age	Source	Reflex %	OH %	CV %	Non-Sync. %	Unexplained %	Setting
< 40 yrs	†	51	2.5	1.1	18	27	ED & CPU
40-60 yrs	†	37	6	3	19	34	ED & CPU
< 65 years	‡	68.5	0.5	12		19	CD
60/65 yrs	‡	52	3	34		11	CD
	§	62	8	11		14	GD
	†	25	8.5	13	12.5	41	ED & CPU
> 75 yrs	§	36	30	16		9	GD

† = Olde Norkcamp
‡ = Del Rosso
§ = Ungar

ED = emergency department
CPU = chest pain unit
CD = cardiology department
GD = geratric department

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Initial evaluation

- The initial evaluation of a patient presenting with T-LOC consists of careful history, physical examination, including orthostatic BP measurements, and electrocardiogram (ECG).

- Based on these findings, additional examinations may be performed.

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Additional examinations

- CSM in patients in patients ≥ 40 years.

- Echocardiogram when there is previous known heart disease or data suggestive of structural heart disease or syncope secondary to cardiovascular cause.

- Immediate ECG monitoring when there is a suspicion of arrhythmic syncope.

- Orthostatic challenge (lying-to-standing orthostatic test and/or head-up tilt testing) when syncope is related to the standing position or there is a suspicion of a reflex mechanism.

- Other less specific tests such as neurological evaluation or blood tests are only indicated when there is suspicion of nonsyncopal T-LOC.

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Syncope in the context of T-LOC

Clinical presentation
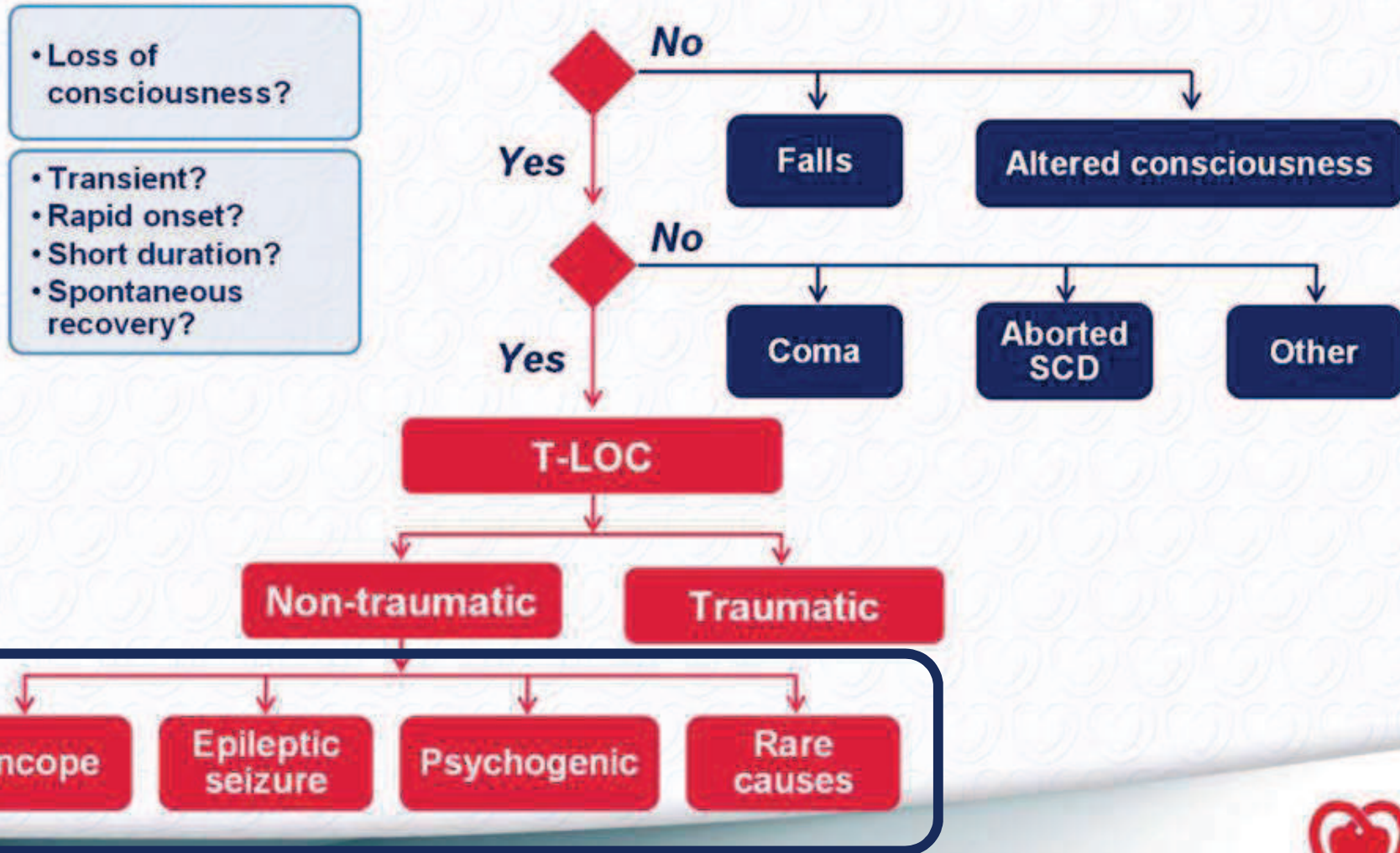
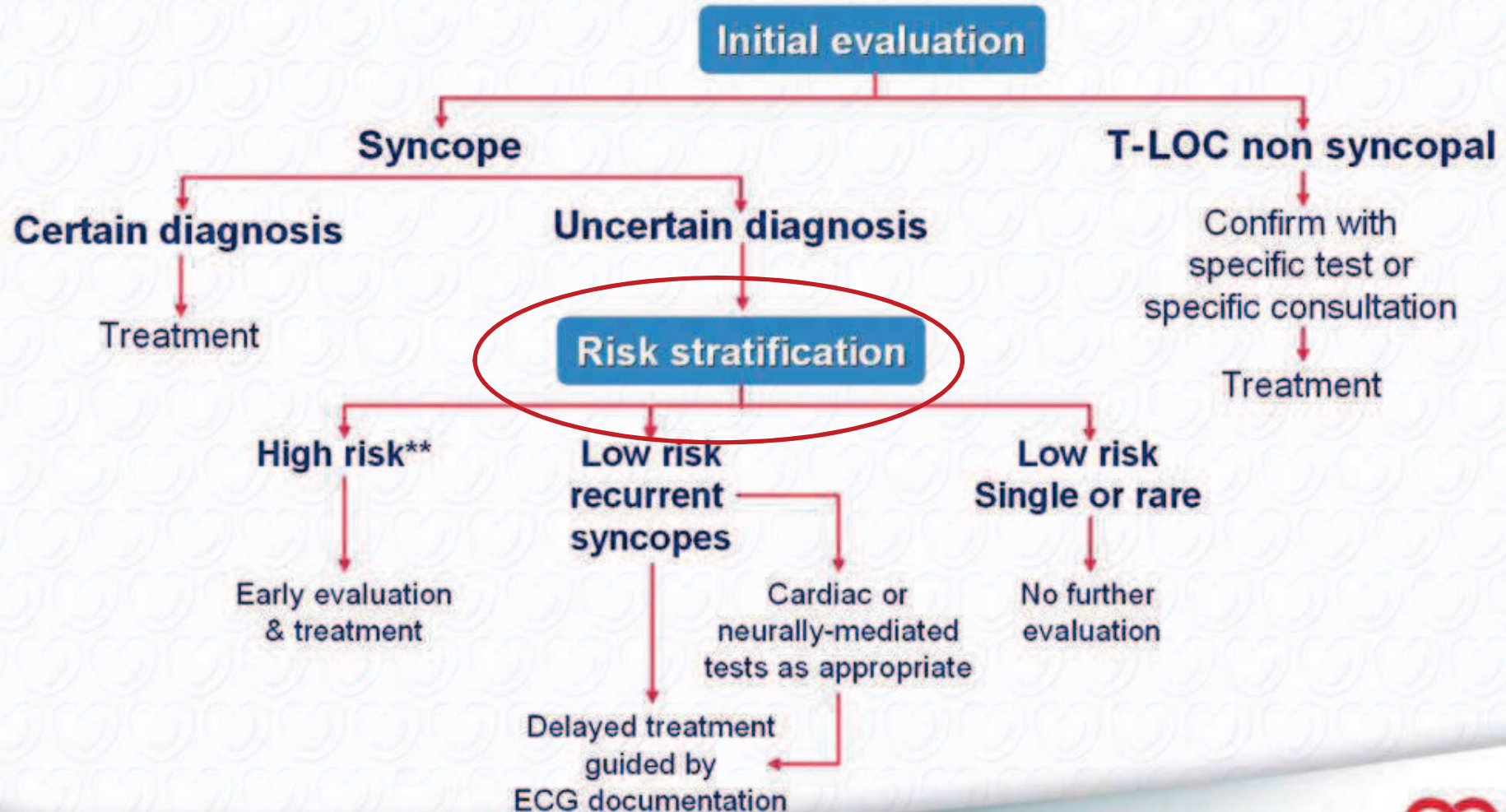# Diagnostic criteria with initial evaluation

	Class	Level
Vasovagal syncope is diagnosed if syncope is precipitated by emotional distress or orthostatic stress and is associated with typical prodrome.	I	C
Situational syncope is diagnosed if syncope occurs during or immediately after specific triggers (cough, sneeze, GI stimulation, micturition, post-exercise, post-prandial.	I	C
Orthostatic syncope is diagnosed when it occurs after standing up and there is documentation of orthostatic hypotension.	I	C
Arrhythmia related syncope is diagnosed by ECG when there is: – Persistent sinus bradycardia < 40 bpm in awake or repetitive sinoatrial block or sinus pauses > 3 s. – Mobitz II 2nd or 3rd degree atrioventricular block. – Alternating left and right BBB. – VT or rapid paroxysmal SVT. – Non-sustained episodes of polymorphic VT and long or short QT interval. – Pacemaker or ICD malfunction with cardiac pauses.	I	C
Cardiac ischaemia related syncope is diagnosed when syncope presents with ECG evidence of acute ischaemia with or without myocardial infarction.	I	C
Cardiovascular syncope is diagnosed when syncope presents in patients with prolapsing atrial myxoma, severe aortic stenosis, pulmonary hypertension, pulmonary embolus or acute aortic dissection.	I	C

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Diagnostic flowchart in patients with suspected T-LOC

T-LOC – suspected syncope

Initial evaluation

Syncope

T-LOC non syncopal

Certain diagnosis

Uncertain diagnosis

Treatment

Risk stratification

Confirm with specific test or specific consultation

Treatment

High risk**

Low risk recurrent syncopes

Low risk Single or rare

Early evaluation & treatment

Cardiac or neurally-mediated tests as appropriate

No further evaluation

Delayed treatment guided by ECG documentation

Webové algoritmy vyšetřování synkopy

University of Utah

The Faint-Algorithm as Currently Used at the University of Utah

The case of a patient referred for unexplained syncope without ECG abnormalities or structural heart disease is shown. After all of the essential information obtained from history, physical examination, 12-lead ECG, echocardiogram, and appropriate blood tests was entered, the software determined the short-term risk and need for admission (A, red arrow). If the decision is made not to admit the patient, the software uses the available information to verify whether a certain diagnosis can be made or not as defined in the recent ESC guidelines.

If no diagnosis can be made, the software suggests the most likely diagnosis (B, red arrow) and recommends the appropriate tests to be performed in a sequential manner, resulting in cost-effective practices (C, red arrow). At any step, the health care provider is given the opportunity to agree or disagree with the software recommendation.

In addition, he or she has access to the most recent educational material, including the guidelines, by clicking on the "?" button. AHA = American Heart Association; TIA = transient ischemic attack; other abbreviations as in Figure 1.

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Risk stratification

- **Short-term high-risk criteria requiring prompt hospitalization or intensive evaluation:**

  - Severe structural or coronary artery disease (HF, low EF or prior MI).

  - Clinical or ECG features suggesting arrhythmic syncope:
    - Syncope during exercise or supine.
    - Palpitations at the time of syncope.
    - Family history of Sudden cardiac death (SCD).
    - Non-sustained VT.
    - Bifascicular block (LBBB or RBBB combined with left anterior or left posterior fascicular block or other intraventicular conduction abnormalities with QRS duration ≥ 120 ms.
    - Inadequate sinus bradycardia (< 50 bpm) orsino-atrial block in absence of negative chronotropic medications or physical training.
    - Pre-excited QRS complex.
    - Prolonged or short QT interval.
    - RBBB pattern with ST-elevation in leads V1-V3 (Brugada pattern).
    - Negative T waves in right precorial leads, epsilon waves and ventricular late potentials suggestive of ARVC.
    - Family history of SCD.

  - Important co-morbidities (severe anemia, electrolyte disturbance).

Diagnostické testy

Recommendations
Carotid sinus massage (CSM)

	Class	Level
Indications:		
– CSM is indicated in patients > 40 years with syncope of unknown aetiology after initial evaluation.	I	B
– CSM should be avoided in patients with previous TIA or stroke within the past 3 months and in patients with carotid murmurs (except if carotid Doppler studies exclude significant stenosis).	III	C
Diagnostic criteria:		
– CSM is diagnostic if syncope is reproduced in presence of asystole longer than 3 s and/or fall in SBP > 50 mmHg.	I	B

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Recommendations
Active standing

- **Indications:**

  – Manual intermittent determination with sphygmomanometer of BP supine and during active standing for 3 min is indicated as initial evaluation when OH is suspected.

  – Continuous beat-to-beat non invasive pressure measurement may be useful in case of doubt.

- **Diagnostic criteria:**

  – The test is diagnostic when there is a *symptomatic fall* in SBP from baseline value ≥ 20 mmHg or DBP ≥ 10 mmHg or a decrease of SBP to < 90 mmHg.

  – The test should be considered diagnostic when there is an *asymptomatic fall* in In SBP from baseline value ≥ 20 mmHg or DBP ≥ 10 mmHg or a decrease of SBP to < 90 mmHg.

Class	Level
I	B
IIb	C
I	C
IIa	C

Recommendations
Tilt testing

	Class	Level

- **Methodology:**

  – Supine pre-tilt phase of at least 5 min, when no venous cannulation, and of at least 20 min, when cannulation is undertaken, is recommended. — I — C

  – Tilt angle between 60° to 70° is recommended. — I — B

  – Passive phase of a minimum of 20 min and a maximum of 45 min is recommended. — I — B

  – For nitroglycerine, a fixed dose of 300-400 µg sublingually administered in the upright position is recommended. — I — B

  – For isoproterenol, an incremental infusion rate from 1 up to 3 µg/min in order to increase average heart rate by about 20-25% over baseline is recommended. — I — B

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Recommendations
Tilt testing

- **Diagnostic criteria:**

  - In patients without structural heart disease, the induction of reflex hypotension/bradycardia **with** reproduction of syncope or progressive OH (with or without symptoms) are diagnostic of reflex syncope and OH respectively.

  - In patients without structural heart disease, the induction of reflex hypotension/bradycardia **without** reproduction of syncope may be diagnostic of reflex syncope.

  - In patients without structural heart disease, arrhythmia or other cardiovascular cause of syncope should be excluded prior to considering positive tilt test results as diagnostic.

  - Induction of LOC in absence of hypotension and/or bradycardia should be considered diagnostic of psychogenic pseudo syncope.

Class	Level
I	B
IIa	B
IIa	C
IIa	C

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Recommendations
ECG monitoring

- **Indications:**
  - ECG monitoring is indicated in patients with clinical or ECG features suggesting arrhythmic syncope.
  - Immediate in-hospital monitoring (in bed or telemetric) is indicated in high risk patients.
  - Holter monitoring is indicated in patients with frequent syncope or presyncope (≥ 1 per week).
  - ILR is indicated in:
    - An early phase of evaluation in patients with recurrent syncope of uncertain origin, absence of high-risk criteria and high likelihood of recurrence within battery longevity of the device.
    - High-risk patients in whom a comprehensive evaluation did not demonstrate a cause of syncope or lead to a specific treatment.
  - ILR should be considered to assess the contribution of bradycardia before to consider cardiac pacing in patients with suspected or certain reflex syncope presenting with frequent or traumatic syncopal episodes.
  - External loop recorders should be considered in patients who have inter-symptom intervals ≤ 4 weeks.

Class	Level
I	B
I	C
I	B
I	B
I	B
IIa	B
IIa	B

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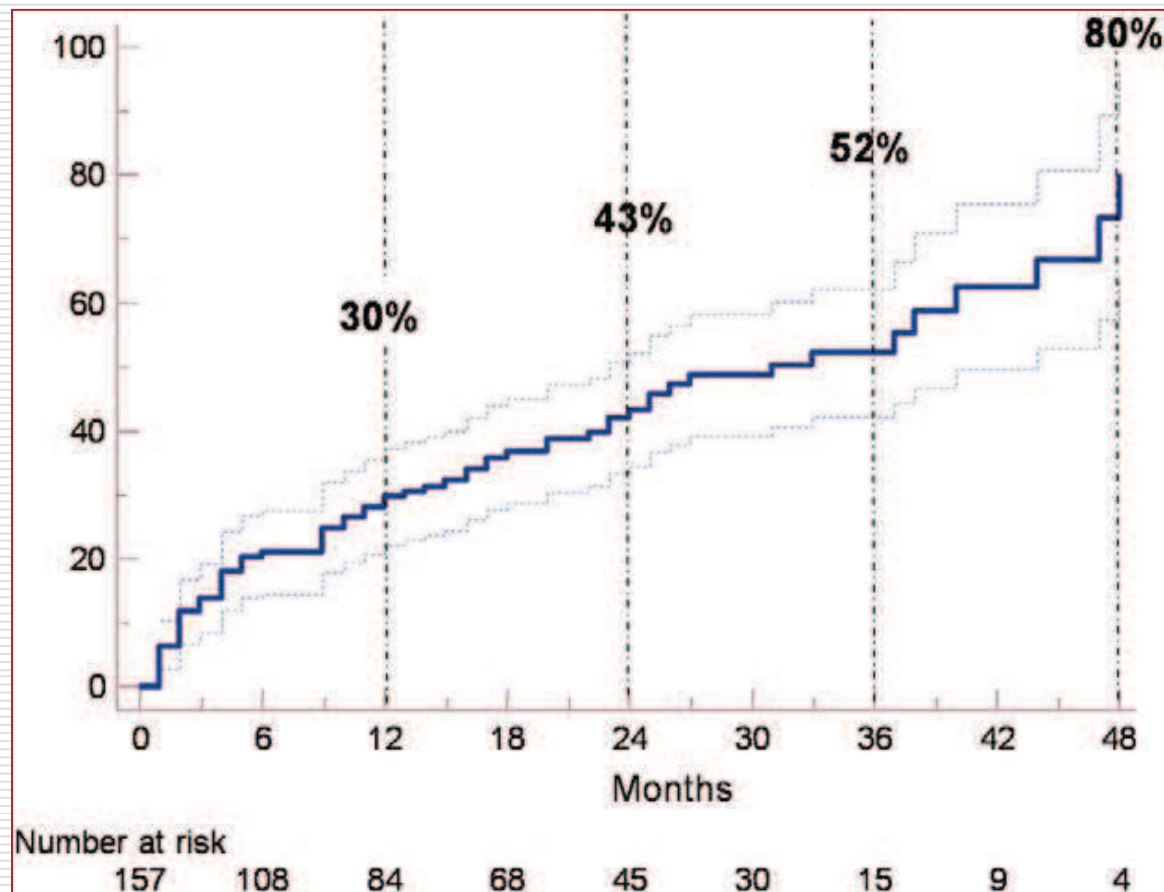
Úloha ILR v detekci příčiny synkopy

Figure Legend:

Time-Dependent Cumulative Diagnostic Yield of ILR

The actuarial curve with its 95% confidence intervals is presented. ILR = implantable loop recorder.

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Recommendations
Electrophysiological study (EPS)

- **Indications:**

  - In patients with ischaemic heart disease, EPS is indicated when initial evaluation suggests an arrhythmic cause of syncope unless there is already an established indication for ICD.

  - In patients with BBB, EPS should be considered when non invasive tests failed to make the diagnosis.

  - In patients with syncope preceded by sudden and brief palpitations non invasive tests failed to make the diagnosis.

  - In patients with Brugada syndrome, ARVC and hypertrophic cardiomyopathy (in selected cases).

  - In patients with high-risk occupation requiring to exclude a CV cause (in selected cases).

  - EPS is not recommended in patients with normal ECG, no heart disease and no palpitations.

Class	Level
I	B
IIa	B
IIb	B
IIb	C
IIb	C
III	B

Recommendations
Electrophysiological study (EPS)

Class **Level**
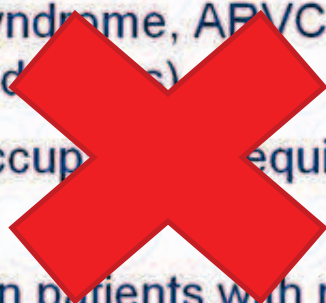
- **Diagnostic criteria:**

  – EPS is diagnostic and no additional tests are required in:

    - Sinus bradycardia and prolonged CSNRT (> 525 ms). **I** **B**

    - BBB and either a baseline HV interval of ≥100 ms, or 2nd or 3rd degree His-Purkinje block. **I** **B**

    - Induction of sustained monomorphic VT in patients with previous MI. **I** **B**

    - Induction of rapid SVT which reproduces hypotensive or spontaneous symptoms. **I** **B**

  – An HV interval between 70 & 100 ms should be considered diagnostic. **IIa** **B**

  – Induction of polymorphic VT or VF in patients with Brugada syndrome, ARVC & patients resuscitated from cardiac arrest may be considered diagnostic. **IIb** **B**

  – Induction of polymorphic VT or VF in patients with ischaemic or DCM cannot be considered a diagnostic. **III** **B**

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Recommendations
Adenosine triphosphate test (ATP)

Class	Level
III	B

- **Indications:**
  - Owing to lack of correlation with spontaneous syncope, ATP test cannot be used as a diagnostic test to select patients for cardiac pacing.

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Recommendations
Echocardiography

	Class	Level

- **Indications:**
  - Echocardiography is indicated for diagnosis and risk stratification in patients who are suspected of having structural heart disease.

  Class I, Level B

- **Diagnostic criteria:**
  - Echocardiography alone is diagnostic of the cause of syncope in severe aortic stenosis, obstructive cardiac tumours or thrombi, pericardial tamponade, aortic dissection and congenital anomalies of coronary arteries.

  Class I, Level B

Recommendations
Exercice testing

	Class	Level

- **Indications:**
  - Exercise testing is indicated in patients who experience syncope during or shortly after exertion.

    | I | C |

- **Diagnostic criteria:**
  - Exercise testing is diagnostic when syncope is reproduced during or immediately after exercise in the presence of ECG abnormalities or severe hypotension.

    | I | C |

  - Exercise testing is diagnostic if Mobitz II 2nd degree or 3rd degree AV block develop during exercise even without syncope.

    | I | C |

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Recommendations
Psychiatric evaluation

- **Indications:**

  - Psychiatric evaluation is indicated in patients in whom T-LOC is suspected to be psychogenic pseudosyncope.

  - Tilt testing, preferably with concurrent EEG recording and video monitoring may be considered for diagnosis of T-LOC mimicking syncope ("pseudosyncope") or epilepsy.

Class	Level
I	C
IIb	C

Recommendations
Neurological evaluation

- **Indications:**

	Class	Level

  - EEG, ultrasound of neck arteries and computed tomography or magnetic resonance imaging of the brain are not indicated, unless a non-syncopal cause of T-LOC is suspected. — **III**, **B**

  - Neurological evaluation is indicated in patients in whom T-LOC is suspected to be epilepsy. — **I**, **C**

  - Neurological evaluation is indicated when syncope is due to ANF in order to evaluate the underlying disease. — **I**, **C**

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Terapie

Treatment of syncope
Diagnostic evaluation

Reflex and orthostatic intolerance		Cardiac		Unexplained and high-risk of SCD
Unpredictable or high frequency	**Predictable or low frequency**	**Cardiac arrhythmias**	**Structural (cardiac or cardio-pulmonary)**	**i.e. CAD, DCM HOCM, ARVC, Channelopathies**
Consider specific therapy or delayed treatment (guided by ECG documentation	Education, reassurance avoidance of triggers usually sufficient	Specific therapy of the culprit arrhythmia	Treatment of underlying disease	Consider ICD therapy according current ICD guidelines

Treatment of reflex syncope

	Class	Level
Explanation of the diagnosis, provision of reassurance and explanation of risk of recurrence are indicated in all patients.	I	C
Isometric counterpressure manoeuvres are indicated in patients with prodrome.	I	B
Cardiac pacing should be considered in patients with dominant cardioinhibitory CSS.	IIa	B
Cardiac pacing should be considered in patients with frequent recurrent reflex syncope, age > 40 years and documented spontaneous cardioinhibitory response during monitoring.	IIa	B
Midodrine may be indicated in patients with VVS refractory to lifestyle measures.	IIa	C
Tilt training may be useful for education of patients but long-term benefit depends on compliance.	IIb	B
Cardiac pacing may be indicated in patients with tilt-induced cardioinhibitory response with recurrent frequent unpredictable syncope and age > 40 after alternative therapy has failed.	IIb	C
Cardiac pacing is not indicated in the absence of a documented cardio-inhibitory reflex.	III	C
Beta-adrenergic blocking drugs are not indicated.	III	A

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Syncope due to cardiac arrhythmias
Recommendations

Treatment of syncope due to cardiac arrhythmias

Class	Level
I	B

- Syncope due to cardiac arrhythmias must receive treatment appropriate to the cause

Syncope in the elderly

- OH is not always reproducible in older adults (particularly medication and age-related). Therefore, orthostatic BP appraisal should be repeated, preferably in the morning and/or promptly after syncope.

- CSM is particularly useful even if non-specific carotid sinus hyper-sensitivity is frequent without history of syncope.

- In the evaluation of reflex syncope in older patients tilt testing is well tolerated and safe, with positivity rates similar to those observed in younger patients, particularly after nitroglycerine challenge.

- Twenty-four hour ambulatory BP recordings may be helpful if instability of BP is suspected (e.g., medication or post prandial).

- Due to the high frequency of arrhythmias, ILR may be especially useful in the elderly with unexplained syncope.

- Evaluation of mobile, independent, cognitively normal older adults must be performed as for younger individuals.

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Recommendations concerning driving in patients with syncope

Diagnosis	Group 1 (private drivers)	Group 2 (professional drivers)
Cardiac arrhythmias		
Cardiac arrhythmia, medical treatment	After successful treatment is established	After successful treatment is established
Pacemaker implant	After one week	After appropriate function is established
Successful catheter ablation	After successful treatment is established	After long-term success is confirmed
ICD implant	In general low risk, restriction on case by case	Permanent restriction
Reflex syncope		
Single/mild	No restrictions	No restriction unless it occurred during high risk activity
Recurrent and severe	After symptoms controlled	Permanent restriction unless effective treatment has been established
Unexplained syncope		
	No restrictions unless absence of prodrome, occurrence during driving or presence of severe structural heart disease	After diagnosis and appropriate therapy is established

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Koncept Syncope Unit

Proč vytvářet SU

Expected Benefits	Barriers to establishing an SU
• Specialist opinion for patients	• Lack of awareness of the benefits of an SU due to inadequate research trials comparing an SU to normal practice
• Early accurate and efficient diagnosis	• Underestimation of consequences of syncope
• Timely treatment	
• Better application of recommended guidelines	• Lack of awareness of benefit of an SU on quality of life
• Less duplication and fragmentation of services	• Low numbers of syncope specialists
• Single source of communication for all stakeholders	• Lack of formal syncope training programs
• Shorter length of stay for hospital inpatients	• Wide age range from paediatric to oldest patients
• Reduction of total care costs	• Skill sets required in a number of domains such as cardiology, geriatrics, paediatrics, physiology, neurology and psychiatry
• Better systems for monitoring and evaluation of practice at local, national and international level	• Syncope not a recognized subspecialty
• Better quality control at local, national and international level	• Reluctance to introduce innovative proposals
• Access to harmonised data across different hospitals	• Necessity to engage multiple stakeholders
• High quality, evidence based data for research	• Inadequate reimbursement of syncope core management
• Evidence based innovation in diagnosis, treatments and health care model	• New economic cost models required to evaluate an SU
	• Fear of increasing costs by the development of a new structure instead of reducing them

Komplexní kardiovaskulární centrum

Lékařská fakulta Univerzity Palackého v Olomouci

I. INTERNÍ KLINIKA KARDIOLOGICKÁ
FAKULTNÍ NEMOCNICE OLOMOUC