# SYNCOPE

BY

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# 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

# Conditions incorrectly diagnosed as syncope

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

- **Disorders without impairment of consciousness:**
- - Cataplexy(muscular rigidity,fixity of posture and decreased pain sense)
- - Drop attacks,
- - Falls,
- - Functional (psychogenic pseudosyncope),
- - TIA of carotid origin.

# PRESYNCOPE

- Many forms of syncope are preceded by a prodromal state that often includes dizziness and loss of vision ("blackout") (temporary), loss of hearing (temporary), loss of pain and feeling (temporary), nausea and abdominal discomfort, weakness, sweating, a feeling of heat, palpitations and other phenomena, which, if they do not progress to loss of consciousness and postural tone , are often denoted "*presyncope*".

# 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 dysfunction (including bracv-carota/ 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 ischemia /infarction, hypertrophic cardiomyopathy. cardiac* masses *(atrial myxoma, tumors, etc), pericardial dlsease/ tamponade, congenital anomalies of coronary arteries, prosthetic valves dysfunction.*

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

- Although syncope may cause physical injury such as head trauma, it is specifically not directly caused by head trauma (concussion) or by a seizure disorder which may also produce short-lived unconsciousness unless these are also associated with globally reduced brain blood flow. Syncope is extraordinarily common, occurring for the most part in two age ranges: the teen age years, and during older age.

# 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.

*The initial evaluation should answer three key questions*:

- 1. Is it a syncopal episode or not?
- 2. Has the aetiological diagnosis been determined?
- 3. Are there data suggestive of a high risk of cardiovascular events or death?

# Diagnostic criteria with initial evaluation

- *Vasovagal syncope* is diagnosed if syncope is precipitated by emotional distress or orthostatic stress and is associated with typical prodrome.
- *Situational syncope* is diagnosed if syncope occurs during or immediately after specific triggers (cough, sneeze, GI stimulation, micturition, post-exercise, post prandial.
- *Orthostatic syncope* is diagnosed when it occurs after standing up and there is documentation of orthostatic hypotension.

- *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.
- *Cardiac ischaemia related syncope* is diagnosed when syncope presents with ECG evidence of acute ischaemia with or without myocardial infarction.
- *Cardiovascular (structural) syncope* is diagnosed when syncope presents in patients with prolapsing atrial myxoma, severe aortic stenosis, pulmonary hypertension, pulmonary embolus or acute aortic dissection.

# Additional examinations

- CSM (carotid sinus massage) 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 (Iying-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.

# Diagnostic tests

1- carotid sinus massage

2-active standing

3-tilt testing

4-ECG monitoring

5-EPS

6-Echocardiography

7-exercise test

8-neurological evaluation

9-psychiatric evaluation

# Carotid sinus massage (CSM)

-indicated in patients > 40 years with syncope of unknown aetiology

-avoided in patients with previous TIA or stroke within the past 3 months and in patients with carotid murmurs

-diagnostic if syncope is reproduced in presence of asystole longer than 3 s and/or fall in SBP> 50 mmHg.

# Active standing

-indicated as initial evaluation when OH is suspected

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

-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 SSP to < 90 mmHg C L

# Tilt Testing

-Supine pre-tilt phase of at least 5 min

-Tilt angle between 60° to 70° is recommended. (20 min -45 min )

-??Nitroglycerine sublingually ??isoproterenol,

*Indications:*

-is indicated in case of unexplained single syncopal episode in high-risk settings or recurrent episodes in the absence of organic heart disease,

-demonstrate susceptibility to reflex syncope

-discriminate between reflex and OH syncope.

-differentiate syncope with jerking movements from epilepsy.

-evaluate patients with frequent syncope and psychiatric disease.

*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.

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

# ECG monitoring

*Indications*:

-indicated in patients with clinical or ECG features suggesting arrhythmic syncope

-indicated in patients with frequent syncope or presyncope (> 1 per week).

*Diagnostic criteria:*

-diagnostic when a correlation between syncope and an arrhythmia (tachy or brady) is detected

-In the absence of such correlation, ECG monitoring is diagnostic when periods of Mobitz II or III degree AV block or a ventricular pause>3 s or rapid prolonged paroxysmal SVT or VT are detected.

The absence of arrhythmia during syncope excludes arrhythmic syncope.

# EPS(electrophysiological study)

*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 and non invasive tests failed to make the diagnosis.

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

*Diagnostic criteria:*

- Sinus bradycardia
- BBB
- 2nd or 3rd degree his purkinje block
- Induction of sustained monomorphic VT in patients with previous MI.
- Induction of rapid SVT which reproduces hypotensive or spontaneous symptoms.

# Echocardiography

*Indications:*

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

*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.

# Exercise Test

*Indications:*

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

*Diagnostic criteria:*

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

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

# 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

# Neurological Evaluation

*Indications:*

-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***.

-Neurological evaluation is indicated in patients in whom T-LOC is suspected to be epilepsy.

- Neurological evaluation is indicated when syncope is due to acute neurological insult in order to evaluate the underlying disease

# Treatment

# Treatment of reflex syncope

- Explanation of the diagnosis, provision of reassurance and explanation of risk of recurrence are indicated in all patients.
- Cardiac pacing may be indicated
- Midodrine
- Tilt training may be useful
- Beta-adrenergic blocking drugs are *not* indicated

# Treatment of orthostatic hypotension

- Adequate hydration and salt intake must be maintained.
- Midodrine
- Fludrocortisone
- Abdominal binders and/or support stockings
- Head-up tilt sleeping (> 10°) to increase fluid volume

# Treatment of syncope due to cardiac arrhythmias

***Cardiac pacing***

- sinus node disease in whom syncope is demonstrated to be due to sinus arrest
- syncope and 2nd degree Mobitz II, advanced or complete AV block.
- unexplained syncope and BBB.

## *Catheter ablation*

-indicated in both SVT and VT in the absence of structural heart disease (with exception of atrial fibrillation)

-may be indicated in patients with syncope due to the onset of rapid atrial fibrillation

# *Antiarrhythmic drug therapy*

- in patients with syncope due to onset of rapid atrial fibrillation
- in both SVT and VT when catheter ablation cannot be undertaken or has failed

# *ICD(Implantable cardioverter defibrillator)*

- documented  VT and structural heart disease.
- When sustained monomorphic  VT is  induced at EPS in patients with previous myocardial infarct.
- with documented VT and inherited cardiomyopathies  or channelopathies

# *Indications of ICD in unexplained syncope*

- with ischaemic cardiomyopathy with severely depressed LVEF or HF
- non-ischaemic cardiomyopathy with severely depressed LVEF or HF
- hypertrophic cardiomyopath
- right ventricular cardiomyopathy
- In Brugada syndrome
- In long QT syndrome
- with ischaemic cardiomyopathy without severely depressed LVEF or HF and negative programmed electrical stimulation, ICD my be considered

# THANK YOU