SOLAECE CORNER

Top Advances in the Management of Rhythm Disorder

Approach To Unexplained Syncope

Denise Hachul, MD, PhD.
Heart Institute - University of Sao Paulo Medical School
No conflict of interest to declare
Approach to Unexplained Syncope

Challenges of Syncope Workup

• Identify pts requiring immediate intervention when diagnosis is established.

• Identify, among pts without a diagnosis, what is the appropriate strategy for evaluation: *inpatient* or *outpatient*?

• To find a cost-effective way to establish the diagnosis.
Approach to Unexplained Syncope

Syncope Definition

A paroxysmal and transient loss of consciousness (T-LOC) due to transient global cerebral hypoperfusion.

European Heart Journal (2009) 30, 2631–2671
Conditions mimicking syncope

as the basis for syncope. A sudden cessation of cerebral blood flow for as short as 6–8 s has been shown to be sufficient to cause complete LOC. Experience from tilt testing shows that a decrease in systolic BP to 60 mmHg or lower is associated with syncope.

Systemic BP is determined by cardiac output (CO) and total peripheral vascular resistance, and a fall in either can cause syncope, but a combination of both mechanisms is often present, even if their relative contributions vary. Figure 2 shows how pathophysiology underpins the classification, with low BP/global cerebral hypoperfusion at the center, adjacent to low or inadequate peripheral resistance and low CO.

European Heart Journal (2009) 30, 2631–2671
Approach to Unexplained Syncope

First Step: IS IT A SYNCOPE?

The importance of a detailed history

• Abrupt and transient LOC
• Short duration
• Prodromes or not - when without or with short premonitory symptoms – more severe presentation: physical injury; car accident
• Loss of postural tone or mild and brief convulsive movements
• Post-event symptoms recovery in minutes
Complete flaccidity during unconsciousness argues against epilepsy. The only exception is ‘atonic seizure’, but it is rare, and occurs without a trigger in children with pre-existing neurological problems. Movements can be present in both epilepsy and syncope. In epilepsy movements last 1–2 min and, in syncope, seconds. The jerks in epilepsy are coarse, rhythmic, and usually synchronous, whereas those in syncope are usually asynchronous, small, and non-rhythmic. However, synchronous jerks may occur in syncope, and eyewitnesses may incorrectly report movements.

Sympotms after the event

<table>
<thead>
<tr>
<th>Findings during loss of consciousness (as observed by an eyewitness)</th>
<th>Symptoms after the event</th>
<th>Other clinical findings of less value for suspecting seizure (low specificity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonic–clonic movements are usually prolonged and their onset coincides with loss of consciousness</td>
<td>Prolonged confusion</td>
<td>Family history</td>
</tr>
<tr>
<td>Hemilateral clonic movement</td>
<td>Aching muscles</td>
<td>Timing of the event (night)</td>
</tr>
<tr>
<td>Clear automatisms such as chewing or lip smacking or frothing at the mouth (partial seizure)</td>
<td>Incontinence after the event</td>
<td>‘Pins and needles’ before the event</td>
</tr>
<tr>
<td>Tongue biting</td>
<td>Injury after the event</td>
<td>Headache after the event</td>
</tr>
<tr>
<td>Blue face</td>
<td>Sleepy after the event</td>
<td>Nausea and abdominal discomfort</td>
</tr>
</tbody>
</table>

Other attacks

Cataplexy concerns paresis or paralysis triggered by emotions, usually laughter. Patients are conscious, so there is no amnesia. Together with daytime sleepiness cataplexy ensures a diagnosis of narcolepsy.

Falls may be due to syncope; elderly subjects may not be aware of having lost consciousness. In some subjects disorders of posture, gait, and equilibrium may mimic falls in syncope.

The term ‘drop attacks’ is variably used for Menière’s disease, atonic epileptic seizures, and unexplained falls. The clearest use of the term concerns middle-aged women (rarely men) who suddenly find themselves falling. They remember hitting the floor.

Unexplained falls deserve medical attention.

2.2.10.2 Neurological tests

Electroencephalography

Interictal EEGs are normal in syncope. An interictal normal EEG cannot rule out epilepsy, but must always be interpreted in a clinical context. When uncertain it is better to postpone the diagnosis of epilepsy than falsely diagnose it.

An EEG is not recommended when syncope is the most likely cause of T-LOC, but it is when epilepsy is the likely cause or when clinical data are equivocal. The EEG may be useful to establish psychogenic pseudosyncope, if recorded during a provoked attack.

Table 13

The value of history for distinguishing seizure from syncope (adapted from Hoefnagels et al. 5,149)
TRANSIENT LOSS OF CONSCIOUSNESS

HYSTORY, PHYSICAL EXAMINATION AND ECG

SYNCOPE
- DEFINITE DIAGNOSIS
- SUSPECTED DIAGNOSIS
- UNEXPLAINED

TREATMENT

RISK STRATIFICATION
- HIGH: CARDIAC EVALUATION
  - AUTONOMIC EVALUATION
  - CEREBROVASCULAR EVALUATION
- LOW: SINGLE EPISODE: OBSERVATION
  - RECURRENCE: TILT TEST;
  - LOOP RECORDER

NON SYNCOPE
- CONFIRM WITH SPECIALISTS AND COMPLEMENTARY EXAMS
Approach to Unexplained Syncope

Second Step: RISK STRATIFICATION
The importance of a detailed history

- Are the episodes related to emotional stress or effort?
- Any previous history or symptoms of CAD or HF?
- Palpitations before syncope?
- Autonomic prodromal symptoms?
- Any occurrence in supine position?
- Family history of SD?
OESIL RISK SCORE
EMERGENCY DEPARTMENT

270 consecutive pt - 145 male
Average age: 59 years old

HISTORY, PHYSICAL EXAMINATION AND ECG
(Initial evaluation)

Independent risk factors
End point: Mortality in 12 months

OESIL RISK SCORE
EMERGENCY DEPARTMENT

INDEPENDENT RISK FACTORS

• Age older than 65 years
• Structural Heart Disease
• Absence of premonitory symptoms
• Abnormal ECG

OESIL RISK SCORE
EMERGENCY DEPARTMENT

[Bar chart showing the relationship between OESIL risk score and 12-month all-cause mortality.]
OESIL RISK SCORE
EMERGENCY DEPARTMENT

Survival

OESIL risk score 0-1

OESIL risk score 2-4

log rank $p<0.00001$

Time (days)
The EGSYS RISK SCORE

Predictors of cardiac syncope - follow up (614 +/- 73 days)

- Abnormal ECG and/or heart disease.
- Palpitations before syncope.
- Syncope during effort or in supine position.
- Absence of autonomic prodromes.
- Absence of predisposing and/or precipitating factors.

A score \( \geq 3 \) identified cardiac syncope – sensitivity: 95% and specificity: 61%

Heart. 2008 Jun 2.
RISK STRATIFICATION

SYNCOPE

UNEXPLAINED SUSPECTED

HIGH RISK
- EARLY EVALUATION

LOW RISK
- RECURRENT
- FACILITY TO EVALUATION

LOW RISK SINGLE
- NO FURTHER EVALUATION
Approach to Unexplained Syncope

Syncope: is a Diagnosis a Diagnosis?


The only way to determine a correct etiologic diagnosis is establishing a strong correlation between the results of the tests and the suspicious diagnosis, based on a detailed history, physical examination and ECG.
Approach to Unexplained Syncope

Syncope until unexplained

What is the next step?

Real time ECG monitoring with ILR
Psychogenic Syncope? A Cautionary Note

KHALIL KANJWAL, M.D., YOUSUF KANJWAL, M.D., BEVERLY KARABIN, M.S.N.,
and BLAIRE P. GRUBB, M.D.
Use of an implantable loop recorder to increase the diagnostic yield in unexplained syncope: results from the PICTURE registry

- Prospective, multicentre, observational study
- From November 2006 until October 2009
- 11 countries.
- To determine the effectiveness of the ILR in the diagnosis of unexplained recurrent syncope in everyday clinical practice.
Use of an implantable loop recorder to increase the diagnostic yield in unexplained syncope: results from the PICTURE registry

Europace (2011) 13, 262–269
Use of an implantable loop recorder to increase the diagnostic yield in unexplained syncope: results from the PICTURE registry

- 218 patients (38% of the population) experienced an episode of syncope
- 149 (26% of patients or 68% of episodes) had prodromal symptoms.
- Ten patients (5.2%) had severe trauma associated to the event.

Europace (2011) 13, 262–269
older than 65 years. In the Framingham study (4), the

Syncope and Its Context

Traditionally, the causes of syncope are classified according to etiology and presumed pathophysiology. Figure 1, right column, shows the classification of syncope based on mechanism (7). The software concept was first tested in the EGSYS 2 (Guidelines in Syncope Study 2) follow-up study (26). This prospective multicenter study documented the current practice of 9 syncope units in Italy. The study enrolled 941 consecutive patients affected by unexplained TLOC from March 15, 2007 to September 15, 2008. The majority of patients (60%) were referred from out-of-hospital services, 11% and 13% were immediate and delayed referral, respectively, from the ED (so-called “protected discharge” with an appointment for early assessment), and 16% were hospitalized patients.

From the "Arrhythmologic Centre and Syncope Unit, Ospedali del Tegallio, Lavagna, Italy; and the fFaint and Fall Clinic, University of Utah, Medical Center, Salt Lake City, Utah. Both authors are the inventors of the software described in this paper (Faint-Algorithm, F2 Solutions Inc., Sandy, Utah); and have financial interest in the start-up company that has exclusive rights to the software product. Dr. Hamdan is a consultant for Medtronic and eCardio; and has received fellowship support from Medtronic, Boston Scientific, and Biotronik.

Manuscript received August 19, 2011; revised manuscript received November 26, 2011, accepted November 29, 2011.
Additional diagnostic value of implantable loop recorder in patients with initial diagnosis of real or apparent transient loss of consciousness of uncertain origin.

- ILR implanted in 58 patients;
- Age 71 + 17 years; 25 males;
- 4.6 + 2.3 episodes of real or apparent T-LOC;
- Aiming to distinguishing epilepsy from syncope (#28), unexplained fall from syncope (#29), or functional pseudo-syncope from syncope (#1)

Europace (2014) 16, 1226–1230
Additional diagnostic value of implantable loop recorder

In most cases, epilepsy is not generally difficult to diagnose and can be accepted as of an epileptic nature and treated with antiepileptic drugs. Although the ECG recording provided by the ILR cannot of expected accuracy in differentiating between non-syncope from syncopal episodes. In a study by Ho et al.,

Table 1. Details of 20 episodes of syncopal T-LOC among 16 patients

<table>
<thead>
<tr>
<th>Episode</th>
<th>ILR Documentation</th>
<th>ECG Documentation</th>
<th>Epileptiform Activity</th>
<th>Electroencephalography</th>
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<tbody>
<tr>
<td>1</td>
<td>Arrhythmic</td>
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<tr>
<td>2</td>
<td>Arrhythmic</td>
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<tr>
<td>20</td>
<td>Arrhythmic</td>
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</table>

In our study, the ILR was considered unable to coexist in the same patient. Finally, many patients had no episodes recurred during the following 4 years. This finding underlines the fact that, when an ILR strategy is considered unnecessary. In some of these, ECG monitoring is still ongoing after 20 months of follow-up. This finding underlines the fact that, when an ILR-guided therapy was administered in the 15 patients.
Additional diagnostic value of implantable loop recorder

...fainting, coronary artery disease, and myocardial infarction or heart failure. There are very few data in the literature on ILR monitoring in patients with unexplained fall (Table 3). While ILR monitoring has been able to document an episode in a similarly high percentage of patients presenting with a fall related to unexplained loss of consciousness. The cardiovascular abnormalities identified as risk factors are orthostatic hypotension, carotid sinus hypersensitivity, and abnormal electrocardiogram or echocardiogram finding, history of fainting, coronary artery disease, and myocardial infarction or heart failure. Nevertheless, about 20% of falls in patients with established falls were enrolled on the basis of an arrhythmia was identified. Four ILRs needed to be implanted in order to establish a diagnosis of arrhythmic syncope. This figure is not too much lower than the 35% diagnostic yield provided by ILR monitoring.
SYNCOPE UNIT – INCOR
SYNCOPE UNIT - INCOR
UNIDADE DE SÍNCOPE – INCOR

EMERGENCY UNIT

Diagnósticos

- 67,4% CARDIACA
- 2,3% VASOVAG
- 7% DESORDENS
- 4,7% INEXPLICADA
- 16,2% DIAG. EST.
Thank you!