**Differential diagnosis**

**A standardised sequential clinical examination identified probable causes of syncope in 69% of patients**


**QUESTION:** What are the causes of syncope in patients presenting to the emergency department (ED)?

**Design**

18 month cohort study.

**Setting**

The ED and inpatient services of a major primary and tertiary care hospital in Geneva, Switzerland.

**Patients**

788 consecutive patients ≥ 18 years of age who presented to the ED with a chief symptom of syncope. Patients with symptoms clearly compatible with seizure disorders, vertigo, dizziness, coma, or shock were excluded. 650 patients (82%) were included in the analysis (mean age 60 y, 52% women).

**Diagnostic strategy**

All patients had a standardised evaluation that included a complete history, physical, and neurological examination; laboratory examination (haematocrit and serum concentrations of creatine kinase and glucose); 12 lead electrocardiogram (ECG); testing for orthostatic hypotension; and bilateral carotid massage in patients without contraindications. After the initial evaluation, patients were classified into 3 groups: strongly suspected cause; signs or symptoms suggested a specific cause but required confirmation by selected diagnostic procedures; and undetermined cause. Patients with undetermined causes had extensive cardiovascular testing, transthoracic echocardiography, continuous loop event recorder, signal-averaged ECG, and passive upright tilt testing.

**Main results**

After the initial clinical evaluation, a cause of syncope was strongly suspected in 446 patients (69%). A cause was suspected but required confirmation by diagnostic testing in 67 patients (10%); the diagnosis was confirmed in 49 (73%). A specific cause was undetermined in 155 patients (24%); 122 of these patients had an extensive workup, and probable cause was established in 30 of these patients (25%). The final diagnoses are summarised in the table.

**Conclusion**

A standardised clinical evaluation provided a probable cause of syncope in 69% of patients presenting to the emergency department with a chief symptom of syncope.

**Final diagnoses in patients presenting with syncope**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac causes</td>
<td>69 (11)</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>44 (7)</td>
</tr>
<tr>
<td>Acute coronary syndrome</td>
<td>9 (1)*</td>
</tr>
<tr>
<td>Aortic stenosis</td>
<td>8 (1)*</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>8 (1)*</td>
</tr>
<tr>
<td>Non-cardiac causes</td>
<td>456 (70)</td>
</tr>
<tr>
<td>Vasodepressor syncope</td>
<td>242 (37)</td>
</tr>
<tr>
<td>Orthostatic hypotension</td>
<td>158 (24)</td>
</tr>
<tr>
<td>Carotid sinus hypersensitivity</td>
<td>6 (1)</td>
</tr>
<tr>
<td>Neurological</td>
<td>30 (5)</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>11 (2)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (1)*</td>
</tr>
<tr>
<td>Unknown</td>
<td>92 (14)</td>
</tr>
</tbody>
</table>

*Calculated from data in article.

**Source of funding:** Swiss National Research Foundation.


**COMMENTS**

Determining a cause of syncope is often difficult. Previous studies have shown that cause could be assigned in 59% to 87% of patients.\(^1\)\(^4\)\(^6\)

Vasovagal syncope is common in an ED population (37% to 40%), but orthostatic hypotension has only accounted for up to 7.6% in previous studies.\(^1\)\(^3\) These 2 diagnoses accounted for 61% of the causes in the study by Sarasin et al. The reason for the high proportion of patients with orthostatic hypotension is not clear. Older patients have a higher prevalence of orthostatic hypotension, a possible consequence of the physiological effects of aging, comorbidity, and multiple medications. Patients in previous US studies had a mean age of 41 to 44 years,\(^1\)\(^3\) whereas patients in the study by Sarasin et al had a mean age of 60 years. Thus, the older age of the patients in this study might account for the higher prevalence of orthostatic hypotension.

Many syncope investigators expect that wider use of loop event monitoring, electrophysiological studies (EP), and tilt testing will lead to diagnoses in virtually all patients with syncope. Although the authors reported a final diagnosis in 86% of patients, the high rate was because of the result of the history and physical examination, not the result of diagnostic tests.

The tilt testing protocol did not use chemical stimulation. In most laboratories this protocol has a relatively low yield. Furthermore, EP testing was only done in 16 patients. It is possible that with chemical stimulation (isoproterenol or nitroglycerine) during tilt testing and wider use of EP testing, many of the remaining patients could have been assigned diagnoses.

This study confirms the central role of careful clinical assessment of patients with syncope. The role of extensive testing with EP studies and tilt testing in the remaining patients requires further study.

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