History taking as a diagnostic test in patients with syncope: developing expertise in syncope

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Introduction

Transient loss of consciousness (T-LOC) is very common and caused by many disorders spanning multiple specialties with consequences varying from benign to lethal, necessitating an accurate, efficient diagnostic work-up. The European Society of Cardiology Guidelines on Syncope recommends that the initial work-up of suspected syncope consists of history taking, a physical examination, and ECG. The emphasis on taking a history is justified by its high diagnostic yield.1,2

Surprisingly, there is relatively little research on how data from the medical history are collected and analysed in syncope patients. While a few studies have described evidence-based point scores for diagnosing patients with syncope, the added value of expert history taking in syncope has received less attention.3 The diagnostic yield of the initial work-up by non-expert physicians in patients with T-LOC according to the ESC guidelines is reported to be 60–70% of the initial work-up by non-expert physicians in patients with syncope, the added value of expert history taking in suspected syncope is evaluated.4,5 The diagnostic yield of expert history taking in patients who remain undiagnosed after standardized approaches according to the management model proposed by the ESC is unknown.

The focus of this current opinion is on the roles of evidence-based point scores and expert history taking in diagnosing suspected syncope.

Problems peculiar to syncope

An effective diagnostic strategy for syncope requires knowledge of other causes of T-LOC and hence requires training or experience in relevant aspects of cardiology, neurology, internal medicine, emergency medicine, paediatrics, geriatrics, and psychiatry. These specialties are all within general internal medicine, which has become fragmented leading to decrease in the broad skills of history taking and physical examination.

The majority of patients with suspected syncope have vasovagal or other types of reflex syncope like situational or carotid sinus syncope. In the emergency setting, T-LOC amounts to 1–2% of all presentations and ~40% of these are diagnosed as reflex syncope (Figure 1).6 In dedicated facilities, an even higher percentage (56–73%) of reflex syncope as the cause of T-LOC is reported.1,6

 Reflex syncope has never been claimed by any specialty as its own, so it has become an ‘orphan’ or ‘between disciplines’ condition, not taught properly in any setting. As a result, specialists fall back on attempts to rule out causes in their own field. This involves applying tests of low yield ruling out but not ruling in diagnoses.1,2 While this information has medical importance, it is not perceived to be of great value by the patient who wants diagnosis and treatment. Because reflex syncope is related to abnormal control of arterial blood pressure, physicians caring for patients with unexplained reflex syncope should have an in-depth understanding of circulatory physiology.7,8

Acquiring the necessary knowledge demands in-depth, long-term gathering of knowledge, contrasting with on-the-spot retrieval of isolated pieces of information.

The history as a diagnostic test: research methodology

Test characteristics of isolated symptoms and signs in patients with suspected syncope have been evaluated. Early examples assessed tongue biting, which has a very high specificity for epileptic seizure as the cause of a T-LOC episode.5,2 Although the diagnostic value of separate elements of the history in suspected syncope is known, it may be assumed that a complete history has a much higher diagnostic yield than the sum of its individual components.2

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Data from the history are also applied in decision rules used for risk stratification of patients with syncope, and while this aspect of history taking is not further addressed here in detail, we acknowledge the importance of key diagnostic features of (high-risk) cardiac syncope such as sudden LOC, palpitations, exertional syncope, and family history of sudden death.1,2,9

Combining symptoms and signs to form diagnostic point scores has resulted in tools with reasonable sensitivity and specificity.10 Such tools provide a practical approach to care for non-complex cases by non-experts. Standardized approaches (including guideline pathways, risk rules, and check lists) can be very helpful in identifying dangerous causes of syncope in emergency settings with rapid patient turn-overs. These tools also help novices to start learning the task at hand by offering memory aids safeguarding against interruptions and focusing attention on critical aspects of the task.11,12 However, these methods may also constrain a doctor’s thinking, hamper learning, and inhibit the building of expertise. Whenever symptoms are vague, multiple, or confusing, physicians need different judgment skills, in the form of expertise that can assess how symptoms and signs interact.

It can be difficult to assess whether experts are right in their diagnosis of syncope. A significant challenge is that there is no independent reference standard to diagnose syncope. Assessing the efficacy of the history as a diagnostic test has aspects of circular reasoning. One accepted solution to this problem is to use long-term follow-up as a test of efficacy, relying on ancillary testing, additional new information or an expert review committee.13

**Expert history taking as a diagnostic test in patients with transient loss of consciousness**

The skill in diagnosis of an unexplained condition starts with meticulous gathering of data to document what happened. Information from an eyewitness or from a video of an event should be sought. The medical context, in particular the presence of structural cardiac disease such as cardiomyopathy or channelopathy, should be taken into account.1,2

The key to a successful syncope history is taking enough time and listening carefully to the patient with undivided attention. The physician should sit face-to-face with the patient, preferably not behind a computer. It is essential to ask open-ended not leading questions such as ‘tell me exactly what happened before, during and after the event’. History **building** with the patient instead of history **taking** from the patient is key. The patient needs to feel at ease and to trust the doctor, in order to reveal all important aspects underlying the episode, particularly psychosocial one.14

Clinical reasoning can be modelled as a dual-process system with intuitive (i.e. tacit) and analytical components.15 This dual process can also be distinguished in T-LOC experts at work, with the intuitive and imaginative processes checked by deliberate, analytical, and critical thought. Pattern recognition and intuition are crucial in diagnosis. These are based on exposure to many cases overlaid on a strong formal knowledge structure.16–19 Experts subconsciously pick up diagnostic clues by thoughtful unhurried histories from patients and from witnesses to make a presumptive diagnosis. Hypotheses may develop very early in the process based on minute historical aspects.16–19 Experts assemble diagnostic likelihoods based on multiple facts similar to point scores used in decision rules without thinking much about them. In fact, many patients are diagnosed within a few minutes.16–19 A characteristic of an expert is the richness of mental frames, from which the expert can subconsciously select based on the merged histories of multiple patients with syncope.11,18 This pattern recognition/intuition aspect is comparable with the skill of the best chess players. It is a type of non-analytic reasoning, which, by its speed and apparent lack of computation, is particularly suitable for solving routine problems by almost automated, internalized knowledge structures.16–19 For example, an expert syncope diagnostician hears a patient tell of a sudden LOC with neither prodrome nor symptoms upon awakening, and suspects an arrhythmia until proven otherwise.

When pattern recognition fails, a slower conscious analytical step-by-step approach is needed. A ‘Sherlock Holmes’ approach with careful observation and deductive reasoning is then often applied, paying attention to detail and discrepancies with meticulous review of the history and buried data from old records to check whether something has been missed.15 The expert ponders the circulatory physiology underlying the history of complex syncope.7,8 This analytical checking is crucial, because the intuitive components are sometimes prone to cognitive errors like early closure with loss of sight of alternatives.11,12,15

Beyond this dual nature of expert diagnosis, the professional demeanour of the expert is very important, because excellent communication skills are needed to gather patient stories effectively.20 Experts continue to learn through clinical practice, by reflection and self-criticism, by reading for maintaining a deep knowledge in their specialty, and by listening to other experts (deliberate practice).21

**How to become a syncope expert**

There appear to be no studies on the education of physicians in syncope, nor on the level of expertise required to diagnose or
treat the various forms of syncope and T-LOC (Table 1). This section therefore largely represents the opinions of the authors.

Table 1  Skill set of syncope experts

<table>
<thead>
<tr>
<th>Basic</th>
<th>Details</th>
<th>Overall</th>
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<tbody>
<tr>
<td>Listen to the patient and take enough time. Put the patient at ease.</td>
<td>Determine the timelines of symptoms; how did the day progress?</td>
<td>Build hypotheses, practice pattern recognition, develop illness scripts</td>
</tr>
<tr>
<td>Be face-to-face with the patient. Seek unspoken clues.</td>
<td>Expand the timeline with the story of one or more witnesses</td>
<td>Use analytic reasoning to check intuitive thinking</td>
</tr>
<tr>
<td>Build with the patient rather than take a history from the patient</td>
<td>What medications might have played a role?</td>
<td>Development</td>
</tr>
<tr>
<td></td>
<td>Seek a witness. Obtain a video of an episode.</td>
<td>Learn and invoke circulatory physiology that may contribute to T-LOC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reflect on the skill set used in each syncope patient, and on what it</td>
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<td></td>
<td></td>
<td>would take to expand it.</td>
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<tr>
<td></td>
<td></td>
<td>Learn to read beat-to-beat heart rate and blood pressure tracings</td>
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<tr>
<td></td>
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<td>like an ECG.</td>
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The method of mastering the skill to become an experienced syncope doctor ideally is to see many patients under direct expert guidance. This allows a comparison between expert and trainee thought processes and direct feedback on all aspects of diagnostic performance.15–19 Although ideal, this may be impractical as there are limited numbers of syncope experts. Fortunately, expertise can be acquired without direct expert guidance; most current experts acquired their skills this way. Asking an expert to work as a mentor from a distance for difficult cases is useful at this stage. In all cases, time must be reserved for ‘expert’ history taking as described above. A clinical description of all documented attacks must be sought to ensure that the index attack was similar to those reported earlier, to prevent mistakes. Home video recordings can be of great value. Published point scores help select dangerous causes.10 With time, the relative weights of the items in these lists will become clear and their use will occur subconsciously.

Experience reinforces which combinations of items are useful, allowing doctors to rely more on experience than on point scores. Learning in this early phase must focus on vasovagal and other types of reflex syncope regardless of one’s specialty; these are the most common presentations of T-LOC and are not subject of any specialist training. Mastering reflex syncope may require seeing several hundred cases before the full range of rare forms is encountered. Careful analysis of the surface electrocardiogram (ECG) is important, including paying attention to subtle clues of acute ischaemic heart disease (ST-segment changes), prolonged QTc interval, left ventricular hypertrophy (raising the possibility of hypertrophic cardiomyopathy), and the presence of heart block or short or prolonged PR interval implying a predisposition to arrhythmias.1 Similar to the importance of reading an ECG the interpretation of beat-to-beat blood pressure tracings should be mastered.

Cooperation with other specialists teaches which items they use to diagnose specific T-LOC forms. Dealing with psychogenic pseudo-syncope and pseudo-seizures can be learnt from experts comfortable with the condition, or must be acquired oneself with an adequate commitment of time and an open attitude.22

While the above description focuses on history taking as the prime diagnostic instrument, the ESC guidelines1 help guide the use of ancillary diagnostic tests. A key to securing a diagnosis is to obtain clinical/pathophysiological correlates, i.e. to ‘catch an attack’. Attacks can be provoked though carotid sinus massage or tilt table testing. Spontaneous attacks can also be documented with an implantable loop recorder, although the observation is limited to the ECG. A syncope expert should have experience performing and analysing such investigations. The investment in time is rewarded by insight into the relation between cardiovascular responses, symptoms, and signs.4,5

A continuous reflection of successes and failures closes the learning cycle, allowing a gradual increase in expertise. The essence of a syncope expert is enthusiasm, diligence, patience, and experience with a strong focus on the physician–patient relationship. New syncope experts must already possess the first three of these facets upon which clinical experience can be gained. While there may never be a great many syncope experts, we have a common responsibility to aim for sufficient expertise among the diagnosing generalists and specialists to address the needs of those distressed patients presenting with recurrent complex episodes. Today’s few syncope experts have a duty to propagate their expertise by guiding and monitoring motivated and talented new physicians to better diagnose and care for patients with unexplained syncope.

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References
A misguided lead

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A 72-year-old patient was admitted for a transient ischaemic attack. He had been implanted with a dual-chamber pacemaker 3 weeks ago at another institution. Pacemaker interrogation did not disclose any atrial arrhythmias that may have explained the neurological event. A chest X-ray showed an unusual position of the right ventricular lead (see Panel). This case discusses how to recognize ventricular lead position, and how to deal with lead malposition. Explore the full case on the ESC’s case-based learning website at http://www.escardio.org/education/eLearning/case-based.