Evaluation of Syncope in Outpatient Clinic

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Abstract

Syncope is a common medical problem with clinical manifestation of the different acute condition with high prevalence rates in the outpatient clinic. It is one of the diseases with different pathophysiology and varied aetiology. The scientific approach toward syncope should be classified as uncommon cases of the syncope but standardized guideline with a methodical approach for early diagnosis of a life-threatening condition.

Introduction

Syncope is a common problem in acute outpatient clinics and patients with syncope are initially labeled as having “collapse query cause”; their prevalence rate was 41%, while the recurrent syncope was 13.5%. It has been reported that males have a lower prevalence of syncope than females (15%, versus 22%) [1].

Syncope is defined as an abrupt, transient, complete Loss of Consciousness (LOC), as a result of global cerebral hypoperfusion with a spontaneous rapid onset recovery within many seconds to less than 3 min. Loss of consciousness is a cognitive state in which the patients lack the complete self-awareness, and to respond to stimuli [2-8].

Transient Loss of consciousness is a self-limited that is transient in nature which is spontaneous in onset with complete recovery (30), which is subdivided into mimic-syncope and syncope conditions. Mimic (pseudo) (near) - syncope occurs with the following prodromal symptoms (e.g., dizziness, unsteadiness, visual /auditory disturbances, nausea, diaphoresis, and feeling of coldness) but this does not follow by the loss of consciousness (LOC). Presyncope are most often cause by the following: abnormal electrical firing (seizure, arrhythmia), ischemia in posterior circulation of the brain (vertebro-basilar insufficiency, subclavian-steal syndrome), impaired neuromuscular pathway (cataplexy), history of conversion disorder (psychogenic-syncope), drug or alcohol intoxication [8].

The mortality rate from life-threatening syncope reaches 10% within 6-month, while it reaches 30% in recurrent, undiagnosed and untreated cases. So, the need to standardize guideline for evidence-based better diagnosis and management of syncope will definitely reduce the unnecessary hospital admission and overall cost. The standardize syncope guideline will detect only 9% as serious, ominous cardiac events which need a full investigation [9, 10].

Case Study

Fourteen years old thin girl presented with prodromal symptoms of lightheadedness, a ringing sound in the ears (tinnitus), and a feeling of tunnel vision (loss of peripheral vision). Also, the prodromal symptoms were associated with sudden profuse sweating and nausea for a short duration. The trigger factor was standing upright for the period of the one-hour, then it followed by seconds of unconsciousness. After a while, the girl experience terrible scary extreme fatigue, nausea, dizziness and anorexia after an episode of LOC.

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Discussion

The initial evaluation in patients with a history of syncopes/syncope is by taking a comprehensive history from the patient and the bystander or event witness. Then followed by a complete physical examination, which composed of measurement of vital signs (e.g., heart rate, heart rhythm, lying and standing blood pressure and oxygen saturation), standard 12 lead ECG, doing relevant blood tests, then the use of standardized risk stratification methods to detect benign from life-threatening syncope [11].

From clear history, which is an essential key to syncope diagnosis; firstly, the physician should determine if the collapse was associated with transient or prolonged LOC (flow chart 1). Secondly, establish if the failure was momentary of rapid onset and associated with complete spontaneous recovery. Thirdly, also a physician should exclude the history of trauma and brief seizures, transient ischemic attack. Fourthly, the physician should check whether the syncope is associated with postural change (Orthostatic hypotension), also to review the patient’s drug history (new vasodepressive drugs). Fifthly, the physician should also check, if the history of the syncope is preceded by any prodromal symptoms and if the symptoms are related to the following particular activity (e.g., Micturition, postprandial, prolonged standing, unpleasant situations, and after exertion) and to see if it also associated with a history of nausea and vomiting. Whereas, if prodromal symptoms are absent, there are no warning symptoms associated with chest pain, breathlessness, palpitation, while, if it happens during exertion or supine, it implies that there is positive history of the personal cardiac disease and a definite family history of Sudden Cardiac Death (SCD) due to coronary heart disease, the physician then should also think about the ominous cardiac cause of syncope [11].

Most syncope is caused by autonomic-mediated reflex syncope which constitutes 73% of the causes of syncopal attack, it is either caused by vasovagal syncope, carotid sinus syncope, postural orthostatic tachycardia syndrome. Also, situational syncope which is initiated after micturition, postprandial, defecation, or induces by a persistent severe cough. While orthostatic hypotension which is either primary autonomic failure syndromes (e.g. Parkinson’s disease, multisystem atrophy, or pure autonomic failure), or secondary autonomic failure syndromes (e.g. Diabetic neuropathy, amyloid neuropathy, drug, alcohol-induced orthostatic syncope, or due to volume depletion).

Whereas, the physician should exclude important cause of cardiac syncope, which reaches up to 2.9% of all the syncopal cases (channelopathies, arrhythmias, obstructive valvular heart lesions, cardiomyopathies, and pulmonary emboli). Neurological (seizures and migraines) and Psychiatric syncope (depression, conversion reaction, and school phobia) have a similar prevalence rate of 2, 1, and 2.3% consequently. While, rare causes of syncope are metabolic syncope which only reaches 0.8% (hypoglycemia, anaemia, and hyperventilation). After full investigation and examination, we still have the syncope of unknown origin which reaches 18.8% [11]. The essential characteristics of syncope patient that increase the probabilities of benign are many (e.g. younger age, unknown history of any personal cardiac disease, the presence of triggers (e.g., presence of a severe cough, laugh, micturition, defecation, dehydration, pain, distressful stimulus, and ugly medical environment or scene). While the essential characteristics of patients that increase the probabilities of malignant syncope are many (e.g., age ≥ 60 years, male, the presence of C.V.D., brief prodromal history of palpitation or history of no prodromal, history of short syncope attack during micturition, and positive family history of sudden death) [11].

The next step is that the physician should do a thorough physical examination, which is the ABC (Airway, Breathing, and Circulation resuscitation) approach. The physician should also think of the serious cardiac cause of syncope and life-threatening conditions in many predisposing cases such as pulmonary embolism,

![Figure 1: Long QT syndrome (LQTS)](image-url)
Figure 2: The presence of short PR interval, delta wave, and widening of the QRS Complex in Wolff-Parkinson-White syndrome (WPW) (Ventricular pre-excitation syndrome)

Figure 3: The presence of short PR interval, no delta waves, and also no widening of the QRS complex in Lowe's-Ganong-Levine syndrome

Figure 4: Types of Brugada syndrome

Figure 5: Big giant voltage with S needle like wave, with wave inversion in hypertrophic cardiomyopathy (HCM)

Figure 6: Epsilon wave in arrhythmogenic right ventricular dysplasia along with T-wave inversion, are best seen in V1-V3 (ARVC)

Figure 7: Cardiac ischemia with ST-segment elevation in transmural myocardial infarction (STEMI)
Figure 8: Cardiac ischemia with ST-segment depression in subendocardial infarction.

Figure 9: Sick sinus syndrome show bready-tachycardia with the presence of pause in between.

Figure 10: Ventricular tachycardia

Figure 11: Supraventricular tachycardia

Figure 12: Atrial fibrillation

Figure 13: Atrial flutter
Figure 14: Multifocal atrial tachycardia

Figure 15: Mobitz type 2

Figure 16: Third-degree heart block

Figure 17: Pulmonary emboli S1 Q3 T3 pattern

Figure 18: Pericardial effusion/tamponed with low with QRS voltage

acute myocardial infarction, fatal arrhythmias, acute aortic dissection, and seizures. Then the physician should assess vital signs. If a syncopal patient develops an acute hypoxia, this indicates that the physician should examine patients with a syncopal history of massive pulmonary embolism, but, if the syncopal patient has a heart rhythm abnormality, this may indicate syncopal arrhythmia. Postural blood pressure is used to diagnose orthostatic hypotension, while the discrepancy in blood pressure between the left and right arms indicates acute aortic dissection. A thorough cardiorespiratory examination is a central tool for assessing or diagnosing cardiovascular system such as cardiac failure, structural valvular disease or aortic stenosis and the sudden development of a focal neurologic deficit suggests a vascular ischemic event such as an infarction. Also, syncope patient should be examined for potential injuries as a result of sudden LOC [12, 13].

Standard ECG (Electrocardiogram) a 12 leads ECG should be performed in all patients with syncope attack to rule out bradyarrhythmias or tachyarrhythmias
cardiac causes of syncope. The cardiac causes of syncope are many such as long QT syndrome, Wolff- Parkinson syndrome, Lown- Ganong- Levine syndrome, Brugada syndrome, hypertrophic cardiomyopathy, Arrhythmogenic right ventricular dysplasia, and ischemic heart disease. Other causes are bradyarrhythmia, tachyarrhythmia, conduction abnormalities, pulmonary emboli, and pericardial effusion or tamponed) [14-18].

Doing a general laboratory test may give clues of diagnose the common causes of syncope (e.g., low hemoglobin, lower high sugar, lower Glomerular Filtration Rate (GFR), abnormal cardiac enzymes) also, to detect common metabolic abnormalities such as hypoglycemia, electrolyte imbalance, acute drop in hemoglobin suggests blood loss [18].

The making of a clinical prediction rule or risk stratification (RS) assessment (prognostication) can be used to predict which syncpe patients need admission to the hospital, and which patients can be safely discharged to their home (high vs. low risk). Clinical features of high-risk syncope are many such as presence history of severe structural heart disease or heart failure, and the presence of a ventricular arrhythmia. Also, the asking of the patient if the syncope attack is triggered during exertion or supine and if there is an absence of prodrome or predisposing or precipitating factors can also give a clue to the common causes of syncope. The patient can also ask if there is any history preceded by palpitation or accompanied by chest pain or shortness of breath, and/or any positive family history of sudden cardiacl death. If the examination is suggestive of obstructive valvular heart disease and/or the presence of syncope associated with the history of secondary trauma. The presence of systolic blood pressure of less than 90mm Hg and/or hematocrit less than 30% [19-24].

The physician should use the risk stratification tools, when the cause of syncope is from the uncertain origin. There are many several scoring systems for risk stratification of syncope patient such as Syncope Evaluation in the Emergency Department Study(SEEDS) and Osservatorio Epidemiologico sulla Sincope nel Lazio (OESIL score). While, others such as Evaluation of Guidelines in Syncope Study (EGSYS score), and the San Francisco Syncope Rule (SF SR) may also suitable in outpatient clinics. Each one has their advantages and disadvantages [2-19]. For example, Osservatorio Epidemiologica Sultta Sicope de Lazio RS (OESIL) has high sensitivity but low specificity, 97% and 73% respectively. Also, it should have at least four important factors such as the presence of abnormal ECG, patient age ≥ 65 years, the absence of any prodromal symptoms and personal history of previous cardiovascular disease) [25]. San Francisco (SF) RS (CHESS has; 5 criteria) (98% sensitivity, 56% specificity). It has five elements for proper diagnosis of the presence of congestive heart failure, hematocrit ≤ 30, ECG abnormality, Shortness of Breath (SOB) and systolic blood pressure ≤ 90 mmHg [26].

The use of risk stratification for the syncopal attack in the emergency department (ROSE risk score) has 87% sensitivity, 66% specificity. It contains seven criteria rules; the level of brain natriuretic peptide ≥ 300 pg per mL (300 ng per L), bradycardia (≤ 50 beats per minute), and rectal examination shows faecal occult blood. Then the other factors are the presence of anaemia (haemoglobin level < 9.0 g per dL [90.0 g per L]), chest pain associated with syncope, ECG with Q wave (not in lead III) and Oxygen saturation ≤ 94 percent on room air [25, 26].

Lastly, Boston RS has seven criteria; signs or symptoms of the Acute Coronary Syndrome (ACS), worrisome cardiac history, valvular heart disease, conductive ECG abnormalities, abnormal vital signs, Lastly, the presence of CNS insult findings and the presence of positive family history of sudden death [25-33].

**Conclusion**

In spite of the presence of the high incidence rate of syncope in outpatient clinics, there is still a lack of a standardized guideline to approach syncope patient. Transient loss of consciousness with rapidly regaining consciousness is mostly due to transient global cerebral hypoperfusion. A thorough history and examination can rule out life-threatening condition. If the cause of syncope is undetermined after the initial evaluation, the physician should do a risk stratification assessment. The high-risk patient needs further assessment in hospital. The standardized guideline will reduce cost by reducing unnecessary hospitalization, decreasing inappropriate investigations and eliminate serious causes of syncopal attack.

**References**


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