

Syncope: A Guideline for Primary Care Physicians

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Syncope is a common problem in the pediatric population. Studies show that 15-40% of the population has experienced at least one syncopal episode by early adulthood [1-4]. Although common, most pediatric syncope is benign and can be evaluated and managed by a primary care physician [5]. However, syncope can be a sign of cardiac disease requiring further diagnostic evaluation. The goal of this guideline is to establish a framework for determining the appropriate patients to refer for a cardiology evaluation of syncope.

The differential diagnosis for pediatric syncope is varied. A large, prospective study published in 2008 reported the following etiologies and frequencies [6]:

Etiology	N (%)
Autonomic-mediated reflex syncope (vasovagal syncope, postural orthostatic tachycardia syndrome, situational syncope, and orthostatic hypotension)	346 (73%)
Cardiac syncope (channelopathies, arrhythmias, obstructive lesions, and pulmonary hypertension)	14 (2.9%)
Neurologic syncope (seizures and migraines)	10 (2.1%)
Psychiatric syncope (depression, conversion reaction, and school phobia)	11 (2.3%)
Metabolic syncope (hypoglycemia, anemia, and hyperventilation)	4 (0.8%)
Syncope of unknown origin	89 (18.9%)

This and others studies demonstrate that cardiac causes of syncope are rare [7,8].

The challenge for the primary care physician is to identify these patients for appropriate cardiac evaluation.

A number of studies have shown that a targeted history, physical exam, and ECG can identify patients that are likely to have a cardiac cause of syncope. Using the history, physical exam, and ECG as a screening mechanism, 96% of patients

with a cardiac cause of syncope were identified [7]. If the history suggests a noncardiac cause of syncope and the physical exam and ECG are normal, a cardiac cause of syncope is unlikely[6, 8].

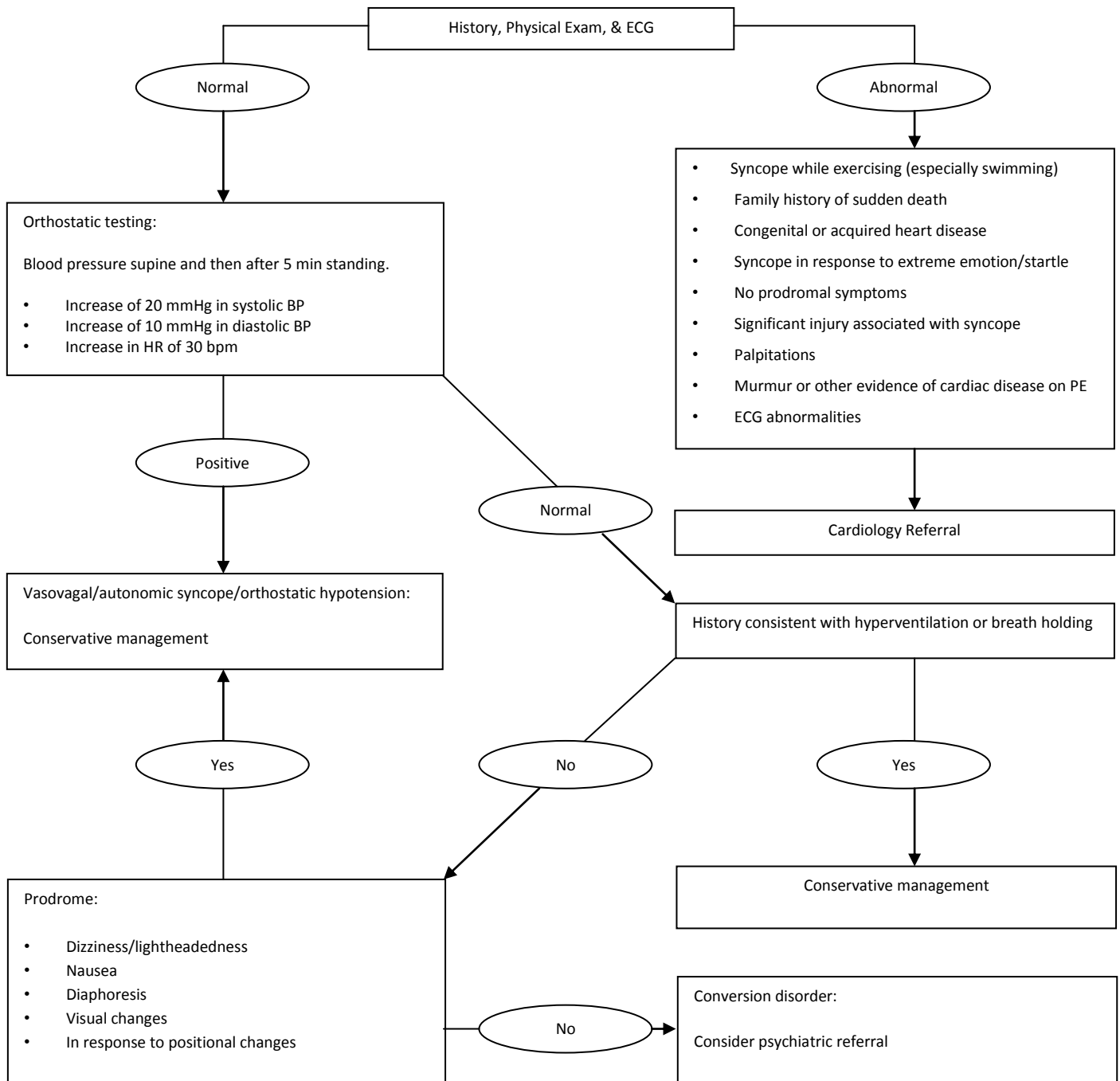
The **history** should evaluate for certain “Red Flags.” If any of these are present, a cardiology referral is indicated. These red flags include a history of syncope during exercise (especially swimming), syncope in response to intense emotion or startle, or syncope without a prodrome (light headedness/dizziness, nausea, pallor, flushing, visual changes, or in response to changes in position). Worrisome features of the history include underlying acquired or congenital heart disease, palpitations, significant injury during the event, a family history of sudden death or aborted sudden death at an early age (<50 years), or a family history of cardiomyopathy.

The **physical exam** should include evaluation of vital sign abnormalities to include tachycardia, bradycardia, evidence of orthostatic hypotension, or an accentuated P-2 component of the second heart sound. One should evaluate for cardiac abnormalities (murmurs, clicks, rubs, or gallops) or evidence of neurologic deficits. Orthostatic hypotension is actually a reassuring finding and does not automatically warrant a cardiology referral as it is consistent with vasovagal syncope. Likewise, sinus bradycardia is a rare cause of syncope and should be interpreted based on the patient’s age and level of fitness. Concerning findings warrant cardiology referral.

The **ECG** is used to identify arrhythmias, second or third degree heart block, pre-excitation (WPW), evidence of chamber enlargement (atrial enlargement or ventricular hypertrophy), ventricular ectopy, QTc prolongation suggesting LQTS (long = QTc >450 msec in adolescent males and >460 msec in adolescent females) or Brugada pattern ST segment changes. Concerning findings on ECG warrant further evaluation by a Pediatric Cardiologist.

The following algorithm can be used to assist in evaluating patients presenting to clinic with syncope [9]:

Algorithm for Evaluation of Pediatric Syncope



After utilizing this evaluation algorithm, the patient can be classified as having a likely cardiac or non-cardiac cause of syncope. Appropriate management can then be undertaken. Management of vasovagal/autonomic syncope will be highlighted as this is the most common etiology for syncope and can be managed by the primary care provider.

Vasovagal/autonomic syncope is a benign condition that typically resolves spontaneously with maturation. Despite the fact that it is benign, frequent events may result in a decreased quality of life. Unfortunately, there is no single effective treatment. Patients and their families require reassurance that the condition is benign in nature and will likely resolve spontaneously over time. Additionally, all children with vasovagal/autonomic syncope should be encouraged to avoid situations that provoke symptoms (abrupt position changes, prolonged standing, etc). They should be encouraged to increase fluid and salt intake, and be shown counterpressure maneuvers.

While there is no established volume of fluid to recommend, instructing the patient to drink non-caffeinated beverages until his/her urine is clear and frequent is a way to ensure that adequate hydration has been achieved. Increasing salt intake can be achieved by adding salt to food. In extreme cases salt supplementation can be given (2 gm up to three times per day); of note, salt supplementation can cause gastric irritation and it is best to take with food. Finally, counterpressure maneuvers include having the patient cross his/her legs with tensing of the calves/thighs/buttocks and clasp hands in front of the chest, tensing them by pulling in opposite directions[10]. Patients should be instructed to sit down or lie down if the prodromal symptoms are noted. Patients should avoid fasting when possible.

While many classes of medication have been used to attempt treatment of vasovagal/autonomic syncope, there is little evidence supporting use in the pediatric population. Recent placebo controlled studies showed beta blockers and fludrocortisone may worsen symptoms in young adult patients [10-13]. There is some evidence supporting the use of midodrine but the results of a large placebo controlled study are pending. Conservative measures should be first-line therapy [14].

In conclusion, the primary care physician plays an important role in the evaluation of pediatric syncope. An evaluation consisting of a history, physical examination, and ECG can help determine whether the patient can be managed

conservatively or whether further evaluation by a sub-specialist is indicated. Reasons for referral to a pediatric cardiologist include any of the Red Flag aspects in the history, an abnormal cardiac exam, an abnormal ECG, or a patient who has failed conservative management.

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