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Research Article

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Syncope in Children

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Abstract

Syncope is defined as a sudden and short-term loss of consciousness and postural tone with rapid sudden and complete recovery lasting from a few seconds to 2 minutes. 30-50% of children have at least one attack of unconsciousness and one in 100 children who come for an examination to the Emergency Pediatric Clinic come under the diagnosis of syncope. It can be preceded by presyncope - a feeling of weakness, paleness, insecurity, tinnitus, dizziness, nausea, "cold sweat", visual disturbances. The patient usually describes that he "darkened before his eyes", "felt weakness in the muscles", lost consciousness, "covered in cold sweat", and eyewitnesses state that he was breathing superficially with a weakly palpable pulse.

Keywords: Syncope, Children, Manifestation, Epidemiology, Diagnosis

Introduction

Syncope, or fainting, is a transient loss of consciousness and tone; it's a typical clinical problem in pediatric patients, particularly during puberty and adolescence [1]. The foremost common causes of syncope in pediatric patients are benign neurocardiogenic events; however, in rare instances syncope may be a harbinger of sudden death from arrhythmia, obstruction of aortic outflow, or other serious cardiovascular events.

The 3 general categories of syncope are neurocardiogenic (also called vasovagal syncope), cardiac syncope, and noncardiac syncope. The workup for syncope can easily become expensive and time-consuming, and it should provide little information beyond that gleaned by the initial history and physical examination. It's the role of the pediatrician to appropriately direct the evaluation for syncope in order that a cost-effective evaluation may occur without missing the patient who could also be at risk for a sudden death event. Syncope may be a temporary and sudden loss of consciousness and postural tone thanks to cerebral hypoperfusion, usually lasting not than 1–2 min [2]. Syncope may be:

A. Autonomic (vasovagal syncope): might also be referred to as neurocardiogenic syncope. it's the foremost common type in children.
B. Cardiac: Mainly associated with arrhythmias, but it can also occur because of leftventricular outflow tract obstruction (e.g., aortic stenosis).
C. Noncardiac: is also due to neurologic etiologies (seizures, migraines), hyperventilation (panic attacks or self-induced), metabolic disturbances (hypoglycemia), or hysteria.

Presyncope or near-syncope has many or all of the prodromal symptoms without loss of consciousness [3]. Syncope is relatively common and is most commonly because of autonomic dysfunction. The frequency of episodes, the amount of stress, and therefore the functional impairment caused by syncope vary. Most syncopal events are relatively benign but can represent a serious cardiac condition which will cause death. The differential diagnosis for typical syncope includes seizure, metabolic cause (hypoglycemia), hyperventilation, atypical migraine, and breath holding.

Manifestation

Syncope, or fainting, is common in childhood [4]. As in adults, it's the results of decreased cardiac output and cerebral perfusion resulting in loss of consciousness and falling. Brief tonic stiffening, clonic jerking or incontinence often accompanies the loss of consciousness and will cause misdiagnosis as an epileptic seizure. Recovery is sometimes prompt following syncope. Light-headedness, dizziness, visual loss, and auditory or sensory changes could also be recalled prior to loss of consciousness; these are manifestations of focal cortical ischaemia. Sweating and tachycardia during recovery are common, as a results of reflex sympathetic drive. However, a more important clue to the diagnosis than the recalled or observed clinical features is that the situation during which the episode occurred. Syncope should be suspected because the basis of loss of consciousness or convulsing when attacks occur con-

temporaneously with vomiting illnesses, prolonged standing (e.g. classroom, church), hair-brushing, injury, venepuncture or other medical procedures, and witnessing medical or veterinary procedures. Syncope without a precipitant, or syncope during exercise or while in water, should prompt concern about a primary cardiac cause, like prolonged QT syndrome or left ventricular outflow obstruction. No investigations, other than perhaps an ECG, are needed in syncope, and most patients and families need only explanation and reassurance. Recognition of precipitating situations and presyncopal symptoms is useful in taking evasive action.

Syncope may be a chief complaint where a detailed history is that the most important aspect of a secure and efficient evaluation within the pediatric patient [5]. That history might suggest a benign cause, like a baby with a prodrome of lightheadedness after being outside on a hot day, whereas a child with exertional syncope while running is during a higher risk category. Other elements, like a family history with sudden unexplained death at a young age or congenital deafness, are red flags which will warrant further investigation. Events leading up to the syncopal episode should be carefully noted, and also the description of the event itself. The absence of prodromal symptoms, presence of preceding palpitations within seconds of loss of consciousness, lack of a prolonged upright posture, syncope during exercise or in response to auditory or emotional triggers, case history of sudden cardiac death (SCD), abnormal physical examination, and abnormal electrocardiogram (ECG) all should raise concern for a cardiac cause. Additionally, standard aspects of the history, like medication use, can provide clues for QT-prolonging medications, among other potential contributing factors.

The accounts of bystanders are helpful but also potentially misleading. The occurrence of tonic-clonic, seizure-like activity is related to cardiac and neurologic causes of syncope, and distinguishing between the 2 etiologies might not be possible. One study found that limb jerking had a sensitivity of 0.686, specificity of 0.877, and a positive likelihood ratio of 5.566 for seizures, making it a moderately helpful but not diagnostic historical feature.

Syncope always results from momentarily inadequate delivery of oxygen and glucose to the brain [6]. There are multiple possible etiologies. Syncope may result from inadequate cardiac output, which might be secondary to obstruction of blood flow, or to an arrythmia. It may also result from inappropriate autonomic compensation for the conventional decline in pressure level that happens on rising from a sitting or supine position. Respiratory disturbances, especially hyperventilation that ends up in hypocapnia, may also cause syncope.

The physical examination focuses upon assessing the hemodynamic stability of the patient. Particular attention is paid to vital signs, especially to pulse and orthostatic blood pressure. A positive ‘‘tilt test’’ could be a decrease in systolic blood pressure by 20 mmHg accompanied by an initial elevation in heart rate (20 beats per minute), which may be followed rapidly by bradycardia and syncope. The patient’s mental status is carefully evaluated and a full neurologic examination performed.

In all patients, a careful cardiac examination is indicated. The regularity of the pulse is noted, as is that the quality of the peripheral pulses. the heart is auscultated carefully to detect the presence of a murmer which will indicate congenital cardiovascular disease, especially aortic stenosis. The standard and presence of all peripheral pulses are evaluated. Diminished pulses within the lower extremities can imply a coarctation of the aorta.

Epidemiology

Syncope could be a temporary, transient loss of consciousness and tonus that usually is related to rapid recovery [1]. It’s the results of decreased cerebral blood flow which will occur through many various mechanisms. Syncopal events are quite common within the pediatric population; up to 50% of faculty undergraduates have reported experiencing syncope or near syncope, and it accounts for approximately 1% of all pediatric emergency department visits. Females are more commonly affected than males, and also the mean age at presentation is 10 to 12 years. Syncope is rare in children younger than 5 years. Many cases of syncope quickly resolve and medical attention isn’t sought; thus, the true incidence of syncope is almost certainly underestimated.

The clinical presentation of syncope varies with the etiology. Vasovagal syncope often is related to a prodrome of symptoms, including lightheadedness, visual disturbances, nausea, and diaphoresis. The patient has usually been standing for a long period or has suddenly moved from the supine or sitting position to standing. Other varieties of neurally mediated syncope include hairgrooming syncope, which occurs mostly in girls while combing, brushing, or blow-drying their hair. Micturition syncope, although most typical within the elderly, may occur in individuals of any age. Younger patients with this sort syncope tend to be male; predisposing factors may include reduced food intake, fatigue, alcohol ingestion, and recent respiratory infection. Micturition syncope often occurs at night when voiding after awakening from sleep (ie, while standing immediately after being recumbent). Recurrences of micturition syncope are rare in young patients. Breath-holding spells in toddlers brought on by anger, pain, fear, or frustration is also related to syncope; this is an infantile type of cardioinhibitory neurally mediated syncope. Infants who experience syncopal breath-holding spells are more likely to get older and have neurally mediated syncope.

Syncope of cardiac etiology often lacks the prodrome of vasovagal syncope. the main cardiac causes of syncope are arrhythmia and left ventricular outflow obstruction. Patients may report palpitations, chest pain, or chest tightness. Cardiac syncope commonly occurs during physical activity and should be accompanied by complete loss of body tone.

Syncope associated with seizures generally has a longer recovery time related to the postictal phase; witnesses may describe the patient as being dazed or "having a blank look on their face" before fainting. These episodes may occur whether the patient is recumbent or upright.

Seizures

Some seizures, like generalized convulsions, are easily recognized while other types are subtler in appearance and less familiar [7]. Common features of seizures include rhythmic jerking of the head or extremities, changes in muscular tonus, fixed staring with or without deviation of the eyes, myoclonic jerks, nystagmus, and/or unresponsiveness.

Infants, and neonates particularly, tend to own multifocal clonic seizures or subtle seizure activity like tongue thrusting and lip smacking. In infants, posturing and unusual movements that aren't otherwise accompanied by eye deviation or alteration in vital signs are usually not seizures.

Other paroxysmal events like syncope, migraine, movement disorders, and "pseudoseizures," is also mistaken for seizures. These can usually be differentiated with a careful history. Syncope is rare in very young children and is usually preceded by a stressful event, giving rise to a vasovagal reaction. Syncope could also be preceded by lightheadedness or nausea. However, a syncopal episode secondary to LQTS may present as a primary afebrile seizure. Confusion or a decreased level of consciousness may accompany migraine, but headache is usually the foremost striking feature. Movement disorders disappear in sleep and don't seem to be related to a decreased level of consciousness. In contrast, seizure activity frequently arises during sleep or shortly after awakening and often causes a change in level of alertness. Differentiating pseudoseizures or nonepileptic spells from true seizures is often difficult within the ED, unless the patient is understood to have had previous nonepileptic spells. The patient may require extended monitoring with continuous EEG and closed circuit television.

For the needs of evaluation and management within the ED, seizures are divided into epilepsy, febrile seizures, first unprovoked seizure, and breakthrough seizures, without regard to the actual appearance of the seizure or its formal classification.

AMS

Altered mental status (AMS) could also be defined as a change in consciousness [8]. Almost any pathological process involving the central nervous system (CNS) may cause AMS. Changes which will be caused by these processes include irritability, lethargy, syncope, seizures, and unresponsiveness. Immediately recognizing that there has been a change in mental status is initially more important than defining the precise style of alteration. The history of how the patient's mental status has changed and also the physical examination will help narrow the list of diagnostic possibilities and guide the initial approach to management.

The patient's reason for admission is vitally important because it can help to acutely determine the etiology of the AMS. Assessment of significant sign trends, respiratory pattern, and current behavior help to see whether the change in mental status is related to a critical ongoing process, like increased intracranial pressure (ICP), or a self-limited event, like a seizure or syncope. If the airway is compromised, plans should be made to intubate the kid immediately. The responses to those questions also help to differentiate between the various forms of alterations in mental status. If this was only a short episode and mental status is improving, an "event" may have occurred that doesn't require immediate treatment. However, if mental status remains altered, an ongoing process should be considered and management started immediately. For instance, if the Cushing triad of systolic hypertension (widening pulse pressure), bradycardia, and irregular respirations is present, increased ICP should be suspected and management begun immediately. If the kid has a history of comparable events, this could help to direct your initial thoughts regarding the reason for the change in mental status. Defining the child's baseline mental status and history of previous alterations in mental status helps to clarify the significance of the current change. Review of the patient's medications may also be very helpful. New medications, missed doses, and pain medications may all cause acute changes in a patient's mental status.

Cough

A cough reflex is initiated by stimulation of the nerves of the respiratory tract mucosa by the presence of dust, chemicals, mucus, or inflammation [9]. The sound of coughing is caused by rapid expiratory air movement past the glottis. Coughing may be a useful procedure to clear excess mucus or foreign bodies from the tract. It only becomes harmful and needs suppression when there's no mucus or debris to be expelled and also the amount of coughing becomes exhausting. This might occur with respiratory tract inflammation. Paroxysmal coughing refers to a series of expiratory coughs after a deep inspiration. Commonly, this happens in children with pertussis (whooping cough) or those that have aspirated a foreign body or a liquid they attempted to drink.

Although helpful in removing mucus, coughing increases chest pressure then may decrease venous return to the heart. This lowers cardiac output and may cause fainting (syncope). Paroxysmal coughing may increase the pressure within the central venous circulation to such an extent that bleeding into the central nervous system (CNS) can result. Because young children often vomit after a series of coughs, they'll be suspected initially of getting a gastric disturbance while their main illness is respiratory.

Diagnosis

Given the numerous possible causes of syncope, a carefully planned approach is preferred to avoid an involved and expensive diagnostic evaluation [10]. The patient history, family history, physical examination, and an electrocardiogram are fundamental and direct the remainder of the evaluation. Important historical

details include the age of the patient (syncope is rare before 10 years old except for breathing holding syncope), time of day (early morning is typical), the state of hydration and nutrition at the time of the event (last fluid or food intake), the environmental conditions (ambient temperature), the patient's activity or body position immediately prior to the syncope episode, the frequency and duration of the episodes, and any aura, prodrome, or specific symptoms prior to the episode. Witnesses should provide details regarding the patient's condition prior to syncope, duration of loss of consciousness, any injuries or seizure-like movements, loss of bowel or bladder function, heart rate during episode, and duration and nature of recovery. Medication history (prescription and over the counter supplements) is critical and should point to proarrhythmic potential. Additionally, a history of severe viral illness like infectious disease frequently precedes the event of vasovagal syncope. Pertinent positives of the past medical history include neurological disorders, traumatic brain injury, and neurosurgical interventions.

It is not uncommon to elicit a history of multiple family members who experienced syncope during adolescence that subsequently resolved. However, if the family history is positive for recurrent syncope, it's also important to consider familial disorders and question about the presence of hypertrophic or dilated cardiomyopathy, long QT syndrome, Brugada Syndrome, exertional syncope (to consider catecholaminergic polymorphic ventricular tachycardia), primary pulmonary hypertension, or arrhythmogenic right ventricular cardiomyopathy. Additionally, families should be asked about sudden unexplained death in children or young adults (drownings, single car accidents, sudden cardiac death, and SIDS), seizures, and congenital deafness. A genetic counselor can frequently be helpful in organizing the family history.

On physical examination, the general condition should be noted, with particular emphasis on hydration, nutritional status (evidence of eating disorders), and manifestations of thyroid disease. Orthostatic vital signs should be obtained, but care must be taken to follow a strict protocol to avoid false positives. Orthostatic hypotension is defined as a decrease in systolic blood pressure of 20 mm hg or a decrease in diastolic blood pressure of 10 mm hg after three minutes of standing when compared with blood pressure within the supine or sitting position. Pulse strength, rate, and any differences between upper and lower extremities should be noted. The presence of heart murmurs suggesting anatomic disease should prompt an echocardiogram. Finally, a phenotype of inherited connective tissue disorders (ie, Marfan Syndrome) should be considered.

An EKG should be obtained, particularly if syncope is recurrent or occurs with exercise. It should be evaluated for heart rate, corrected QT interval, T-wave abnormalities (including T-wave alternans), or any ventricular arrhythmias, in addition as for ventricular pre-excitation, atrioventricular (AV) conduction disturbances, or features in line with Brugada Syndrome. All patients with exertional syncope, even those with positive orthostatic vital signs, should undergo additional evaluation with an echocardiogram and exercise stress testing. Echocardiograms are necessary to examine for cardiomyopathy, myocarditis, anomalous coronary arteries, pulmonary arterial hypertension, and arrhythmogenic right ventricular cardiomyopathy. An exercise test is necessary for catecholaminergic polymorphic ventricular tachycardia. Additionally testing may include a signal averaged EKG, Holter monitor, MRI, cardiac catheterization, and invasive electrophysiological testing. Tilt table testing is less commonly performed in pediatric patients because the diagnosis of vasovagal syncope doesn't require a positive tilt test and results of unclear significance (ie, prolonged asystolic pauses) are common.

Prognosis

- In general very good [11]
- In neurocardiogenic syncope, as patients mature symptoms tend to diminish
- In patients with structural heart disease, prognosis dictated by the heart disease

Conclusion

According to hospital records, syncope is the most common paroxysmal non-epileptic seizure in children. Children with syncope make up about 3 % of all examinations in our emergency services and 1-6 percent of hospitalizations. One in five children typically has one syncopal attack by the age of 5, while 5 to 15 percent of children and adolescents have syncope by the age of 8 to 18. The peak incidence of syncope is between the ages of 15 and 19 years. In 35 percent of children, syncope recurs within the first year. Because of such a high incidence, syncope forms an important part of pediatric emergency care. Almost every day, the emergency service brings a girl (or less often a young man) with a syncopal attack to a pediatric clinic, and then the biggest demands of the parents are to find the cause as soon as possible.

References

1. Berkowitz, C. D. (2020). Berkowitz's Pediatrics: Instructor's Guide. American Academy of Pediatrics.
2. Saadoon, A. Q. (2018). Essential Clinical Skills in Pediatrics. Springer International Publishing.
3. Marcdante, K., Kliegman, R. M., Jenson, H., & Behrman, R. (2015). Essentials of pediatrics. Elsevier, Philadelphia, 11(14), 231.
4. Anderson, V., Northam, E., & Wrennall, J. (2018). Developmental neuropsychology: A clinical approach. Routledge.
5. Schunk, P. C., & Ruttan, T. (2018). Pediatric syncope: high-risk conditions and reasonable approach. Emergency Medicine Clinics, 36(2), 305-321.
6. Strange, G. R., Ahrens, W. R., Schafermeyer, R., Wiebe, R., Prendergast, H., & Dobiesz, V. (2009). Pediatric emergency medicine. McGraw Hill Medical.
7. Morris, S.; Mar, S.; Liang, S. (2018.): „Neurologic Emergencies" in Gershel, J. C.; Crain, E. F.; Cunningham, S. J.; Meltzer, J. A. (eds): „Clinical Manual of Emergency Pediatrics,

Sixth Edition", Cambridge University Press, Cambridge, UK, pp. 529. - 530.
8. Girolami, M. (2019.): „Altered Mental Status" in Nocton, J. J.; Gedeit, R. G. (eds): „On Call Pediatrics, Fourth Edition", Elsevier, Philadelphia, USA, pp. 33. - 34.
9. Pillitteri, A. (2010). Maternal & child health nursing: care of the childbearing & childrearing family. Lippincott Williams & Wilkins.
10. Jone, P. N.; VonAlvensleben, J.; Burkett, D.; Darst, J. R.; Collins, K. K.; Miyamoto, S. D. (2018.): „Cardiovascular Diseases" in Hay jr., W. W.; Levin, M. L.; Deterding, R. R.; Abzug, M. J. (eds): „CURRENT Diagnosis & Treatment - Pediatrics, 24th Edition", McGraw-Hill Education, New York, USA, pp. 624.
11. O'Brien, S. (2007.): „Syncope" in Bauchner, H.; Vinci, R. J.; Kim, M. (eds): „Pediatrics", Cambridge University Press, New York, USA, pp. 442.