Cough Syncope Mimicking Epilepsy in Asthmatic Children

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ABSTRACT: Cough syncope is a more common complication of childhood asthma than formerly recognized. We report twelve children with typical cough syncope who were identified in a pediatric clinic over a period spanning seven years. The condition may be confused with epilepsy because of frequently associated brief clonic convulsive movements during the height of the cerebral anoxia. Cough syncope is readily distinguished from epilepsy by a thorough history. The management and prevention of cough syncope is directed at the aggressive control of bronchospasm in children with asthma.


Syncope may be defined as a brief loss of consciousness associated with transient hypotension, decreased cerebral blood flow and electroencephalographic changes during the attack. Although the condition is common in adults, syncope is rare in children, particularly under ten years of age. Loss of consciousness, which coincides with a paroxysm of coughing, is an unusual type of syncope uncommonly reported in children. As the syncopal episode may be associated with clonic movements, the condition may be confused with epilepsy. We report twelve children with typical cough syncope, many of whom had previously been managed as epileptics unresponsive to anticonvulsant drugs.

PATIENT DATA

During a seven year period from 1977 to 1984, twelve asthmatic children with cough syncope were investigated. There were five females and seven males; the ages ranged from 1 to 16 years with a mean age of 7.2 years. The frequency of the attacks was variable from monthly to once daily for up to a week at a time. The episodes of cough syncope were more frequent when bronchospasm was evident and were particularly common during sleep. Five of the subjects had been treated with conventional antiepileptic drugs because of convulsive movements and urinary incontinence during the attack. All children had perennial asthma and exercise-induced bronchospasm. In seven of the subjects the asthma was often triggered by viral infections. The study included a history, physical and neurological examination, pulmonary function testing, and allergy investigations including skin testing and blood histamine levels performed by cation exchange chromatography. Chest radiographs, electrocardiograms (EKG) and electroencephalograms (EEG) were performed on each patient.

RESULTS

Eleven of the subjects had inhalant allergies and six showed allergic symptoms to specific foods. Pulmonary function testing was completed on eight patients and all showed reversible obstructive lung disease. Chest radiographs, EKG’s and EEG’s performed during symptom-free periods were normal in all subjects. Serum histamine levels were determined on seven subjects as well as from age and sex-matched asthmatics without cough syncope and from a group of normal non-asthmatic children. No statistically significant difference in histamine levels could be determined between these groups.

Follow-up of the twelve children for a period of up to seven years (mean 3.8 years) showed a complete resolution of cough syncope in ten with aggressive asthma management and in only two children is syncope present during severe exacerbations of asthma. No patients have been maintained on anticonvulsants.
 Syncope follows an alteration in brain metabolism, the consequence of decreased cerebral blood flow usually secondary to systemic hypotension. The brain depends upon a constant blood flow and autoregulatory protective mechanisms maintain cerebral circulation and oxygenation in spite of wide fluctuations in the systemic blood pressure. A decrease in blood flow to the brain initially affects the cerebral cortex which is exquisitely sensitive to alterations in the circulation. Ischemia in the region of the cerebral cortex produces a transient loss of consciousness. If the hypoxemia persists, the hypothalamus and midbrain are affected. With increasing ischemia, the higher cortical centres release their inhibiting influence upon the reticular formation within the brainstem. Subsequently, neuronal discharges from the reticular formation produce brief tonic contractions of the axial muscles and associated clonic movements of the face, trunk and extremities. Epileptic movements, in contrast, result from seizure discharges from the cerebral cortex and can readily be recorded on an EEG during a convulsion.

During a syncopal episode, the patient may have fixed upward deviation of the eyes which is not to be confused with epilepsy. The EEG shows transient slowing during the attack, but no seizure discharges. Although "typical" syncopal attacks presumably related to vaso-vagal stimulation and precipitated by pain, fear, excitement or immobilization while standing do occur in children, organic causes, including congenital heart disease, tetralogy of Fallot), aortic stenosis, conduction defects of the heart, hypoglycemia, severe anemia, and of course, episodes of coughing should be sought in this group of patients.

Some forms of epilepsy, particularly complex partial seizures, may present with a blank facial expression and gradual loss of consciousness similar to syncope. Syncope related to cough is quite characteristic. It often occurs shortly after falling asleep and abruptly awakens the child. Asthmatic children have a marked diurnal variation of the disease (tetralogy of Fallot), aortic stenosis, conduction defects of the heart, hypoglycemia, severe anemia, and of course, episodes of coughing should be sought in this group of patients.

Table 1: Characteristics which distinguish Cough Syncope from Epilepsy

<table>
<thead>
<tr>
<th>Asthma with cough paroxysm</th>
<th>COUGH SYNCOPE</th>
<th>TONIC-CLONIC SEIZURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aura</td>
<td>Always</td>
<td>Never</td>
</tr>
<tr>
<td>Color</td>
<td>Never</td>
<td>Occasional</td>
</tr>
<tr>
<td>Duration of tonic-clonic movements</td>
<td>Brief</td>
<td>May be prolonged</td>
</tr>
<tr>
<td>Post-ictal confusion/headache</td>
<td>Very rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>Response to anticonvulsants</td>
<td>None</td>
<td>Good</td>
</tr>
<tr>
<td>EEG</td>
<td>Generalized slow during episode</td>
<td>Seizure discharges during and interictually are frequent</td>
</tr>
</tbody>
</table>

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REFERENCES