In a small number of cases, breath holding spells may be an inherited condition.1 Such patients exhibit a more generalized dysregulation of the autonomic nervous system.2 Researchers have examined the role of reduced central nervous system sensitivity in hypoxia and hypercapnia, as well as abnormalities in pulmonary reflexes and lung mechanics, but they have not reached definitive conclusions about their link to BHS.3

**Diagnosis**

The diagnosis of BHS is usually made by a thorough history of the events surrounding the spells. Although a patient’s history may be strongly suggestive of BHS, always perform a complete differential diagnosis analysis. Rule out epilepsy by conducting a thorough history and ordering an EEG. Although seizure-like activity may occur in children with BHS, an EEG will produce normal results. A prolonged QT interval may be present in children with BHS, so order an electrocardiogram (ECG) and have it reviewed by a pediatric cardiologist.1 Rule out hematologic abnormalities by ordering a complete blood cell count.1

**Treatment**

No treatment can stop breath holding spells. The condition is self-limiting, and the child will outgrow them.7 Iron deficiency may play a role in BHS. Researchers studied the effects of ferrous sulfate solution dosed orally at 5 mg/kg per day for 16 weeks.6 Eighty-eight percent of children in the treatment group exhibited a complete or partial response, compared with fewer than 6% who received the placebo.6 Even children who did not have iron deficiency responded to this treatment, and this phenomenon is not well understood.6 A complete blood count should be done to measure a baseline iron level, but given the positive results of iron supplementation, this therapy should be tried with most children affected by BHS.

**Sequelae**

No long-term effects of benign BHS have been documented. These patients are not at increased risk for neurologic problems.1 The only significant finding on subsequent follow-up was a mildly increased incidence of syncope later in life, especially in childhood or adolescence.1

**Case Example**

My daughter Naomi was 7 months old when she experienced BHS for the first time. By the time she was 9 months old, Naomi had experienced five spells (both cyanosis- and pallor-inducing) and began having seizure activity (tonic-clonic) after the spells. EEG and ECG testing produced normal results. A pediatric neurologist performed a thorough history and workup, and she diagnosed Naomi with complex, severe BHS.

By maintaining a log of the spells, I discovered that most of them occurred before nap time or evening bedtime. I set up a schedule of strict nap times to provide optimum rest. The typical circumstances that triggered BHS were frustration, anger or pain. This prompted her to take a large inhale to cry, and the breath holding would begin. If she could get past the first cry, a spell would not occur.

Despite adjustments to her nap and bedtime routines, Naomi continued to experience BHS one to four times a month until they peaked at the age of 18 months, with seven spells in a single month. At the advice of her pediatrician, I started Naomi on daily iron supplements. Within 2 months, the spells dropped in frequency to only two a month. By the time she was 3 years old, the spells had dropped dramatically in frequency.

The last BHS Naomi experienced was at age 5 years. I have noted no long-term effects of these spells, and Naomi is now a healthy, active and bright 8-year-old.

**Putting It Into Practice**

Because breath holding spells are frightening to witness, parents need to be reassured that the spells are involuntary and that they should not intervene to stop them. Instruct parents to prevent the child from falling and sustaining an injury. The primary strategies are to hold the child or place him or her in a side lying position to help prevent the tongue from occluding the airway.

Parents should not overreact, use mouth-to-mouth resuscitation, place anything in the child’s mouth, give any medications during an episode, or try to overprotect or shelter the child. After the spell ends, the child may be tired and need to lie down before resuming regular activity.

Having a child with BHS is stressful. The spells are unpredictable, and the child is often labeled as having a behavior problem rather than a medical problem.5 It is difficult to find child care due to the unpredictability of the spells and their frightening presentation.

Children who experience severe BHS need structure and consistency to avoid unnecessary tiredness or frustration.7 Continue to reassure the parents and educate them that the episodes will likely disappear by the time the child enters elementary school.

**References**


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Table 1

<table>
<thead>
<tr>
<th>Types of Breath Holding</th>
<th>Characteristics and Progression of Breath Holding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Simple Breath Holding</strong></td>
<td>Change in color without loss of consciousness or tone</td>
</tr>
<tr>
<td><strong>Complex</strong></td>
<td>Change in color with loss of consciousness and tone</td>
</tr>
<tr>
<td><strong>Complex and Severe</strong></td>
<td>Change in color, loss of consciousness, change in tone, and seizure-like activity</td>
</tr>
</tbody>
</table>

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Table 2

<table>
<thead>
<tr>
<th>Age of Onset</th>
<th>Characteristic Color Change</th>
<th>Typical Provocation</th>
<th>Prevalence</th>
<th>Frequency</th>
<th>Termination (age)</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pallid</strong></td>
<td>12–24 months</td>
<td>Pale</td>
<td>Fright or pain</td>
<td>20%</td>
<td>Variable; one spell in a lifetime to multiple spells daily</td>
<td>Usually occurs by school age (7 to 8)</td>
</tr>
<tr>
<td><strong>Cyanotic</strong></td>
<td>Neonate to 24 months</td>
<td>Cyanotic</td>
<td>Frustration or anger</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mixed</strong> (combination of both types)</td>
<td></td>
<td></td>
<td></td>
<td>20%</td>
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</tbody>
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