

BREATH-HOLDING SPELLS: PREVALENCE AND RISK FACTORS IN UNDER 6-YEAR OLD CHILDREN AT SOUTH OF TEHRAN

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Abstract - To determine breath - holding spells (BHS) prevalence and risk factors in under 6-year old children, we interviewed mothers of 400 children in a cross - sectional study in 5 health centers at south of Tehran in autumn 1999. 33 children (8.25%) had history of BHS (Male: 19, Female: 14). 28 cases were between 2-4 years old (mean: 40 ± 17 months). Seventy percent of cases (23) had onset of attacks after 6 months of age (mean: 10 months) and the commonest frequency was one spell per month (78.79%). Painful experience and falling and striking the head were the common triggering factors (79% and 76% respectively) and there was significant association between BHS and history of falling and severe striking of the head. There were no significant associations between BHS and sex, birth weight, birth order, delivery method, type of labor initiating and duration of labor.

Acta Medica Iranica 39 (1): 39-41; 2001

Key Words: Breath-holding spells, syncope, epilepsy, cerebral-anoxia, apnea

INTRODUCTION

Breath-holding spell (BHS) is relatively common in early years of childhood and is one of the differential diagnoses of epilepsy because the child becomes unconscious due to cerebral anoxia at the height of the attacks. There are two major types of BHS. Cyanotic type is more common and initiates by a brief, shrill cry and followed by forced expiration and apnea. There is rapid onset of generalized cyanosis and a loss of consciousness. Pallid spell is much less common and in this type the child stops breathing, rapidly loses consciousness, becomes pale and hypotonic. In both types, attacks end suddenly and child rapidly becomes conscious. The interictal EEG is normal and there is no increased risk of later developing a seizure disorder (1). BHS is rare prior to six months of age and abates by 5 years of age. The management of attacks concentrates on the support and reassurance of the parents (2). The attacks usually take 5 seconds and rarely more than 10-15 seconds (3). We designed this study to determine the prevalence of this disorder among under 6-year old children at south of Tehran and to assess the relation

between BHS and some probable risk factors of BHS among them.

MATERIALS AND METHODS

400 under 6-year old children who came to 5 health-centers in south of Tehran within a period of 3 months (between october 1999 and december 1999) were included in this cross-sectional study. These health centers were assigned at random. Before beginning of the interview, a trained interviewer explained the aims of the interview and described the BHS symptoms in typical order for each mother. Then each mother underwent a structured interview including 2 sections (questionnaire form). In the first section there were 10 questions about age, sex, birth- weight, birth order, history of falling and severe striking of the head and age of it, delivery method, type of labor initiating, duration of labor and history of BHS. The second section composed of 15 questions and was asked in children with clinical history of BHS. This section was about characteristics of BHS including age of onset, frequency of spells, time of onset during the day, relation of attacks to sleep, time of the last attack, provoking factors, type of BHS, history of BHS in siblings and duration of attacks. To exclude children with other common epileptic and non-epileptic paroxysmal events we designed 8 extra questions at the end of our questionnaire form. Whenever answers to all of 5 questions (26-30th) or all of 3 questions (31-33th) or both of them were positive, we excluded the BHS diagnosis. Data analysis was performed with sm-stata program. Chi-square test, Fisher exact test and T test were used for statistical relations.

RESULTS

We studied 188 male (47%) and 212 female (53%). The mean of birth-weight in children with BHS was more than others (3330g versus 3170g) but there was no significant relation between BHS and birth-weight.

64 children (16%) had history of falling and striking of the head (Table 1) and 51 (80%) of these cases had the history before one year of age (Mean: 12.75 months, SE: 1.33). 33 children (8.25%) had history of BHS. Most of these children were between 2-4 years of age (Mean: 40.06, SE: 3) (Table 2). Mean age of BHS' onset was 10 months (Min: 1 month, Max: 24 months). 3 children (10%) had attacks' onset during neonatal period. Frequency of BHS in 7 children (21.21%) was weekly and in 26 children (78.79%) was monthly. Mean age of abating spells was 33 months (Min: 3, Max: 62). The most common provoking factors were painful experience (78.79%), falling and striking of the head(75.76%), upsetting or scolding (63.64%) and frustration (60.61%)

Table 1. Frequency distribution of BHS by age groups.

| age group (month) | breath- holding spell | | | | Total | |
|----------------------|-----------------------|-------|----------|-------|-------|------|
| | positive | | negative | | No | (%) |
| 1-23 | 5 | 15.16 | 129 | 34.15 | 134 | 33.5 |
| 24-47 | 16 | 48.48 | 118 | 32.15 | 134 | 33.5 |
| 48-72 | 12 | 36.36 | 120 | 33.70 | 132 | 33 |

P-value < 0.01

The most common types of BHS were cyanotic (81.82%) , pallid (15.15%) and mixed (3.03%) form respectively. 12 children (36.6%) had positive history of attacks among siblings. In none of our children, BHS has taken longer than 1 minute.

Table 2. Frequency distribution of BHS by history of striking the head.

| History of striking the head | breath- holding spell | | | | Total | |
|------------------------------|-----------------------|-------|----------|-------|-------|-----|
| | positive | | negative | | No | (%) |
| Positive | 13 | 39.39 | 51 | 13.90 | 64 | 16 |
| Negative | 20 | 60.61 | 316 | 86.10 | 339 | 84 |

DISCUSSION

Similar to other studies, age of BHS onset in most of our cases was under one year of age (5,6). Some references have mentioned BHS is rare before 6 months of age (1,3) but in 30.3% of our cases attacks occurred before this age. Despite higher percentage of males compared to females in our cases (57.6% vs. 42.4%), like other studies there was no significant relation between BHS and sex (3). DiMario (1) and Chutorian (3) reported positive history of BHS in first degree relatives (father, mother, brother and sister)

21% and 25% respectively, but their percentages were lower than ours. Frequency of BHS in most of our children was monthly and this is less than similar studies (5). According to Lombroso & Lerman's study, frequency of attacks decreases apparently after 3 years of age and BHS abates until 5-6 years of age (6); but in 70% of our cases reduction of the frequency of BHS or abating of attacks occurred between 17-54 months of age. We studied many perinatal factors but there was no significant relation between BHS and these factors. These findings confirmed the results of other studies (5). One of our most interesting features was relation between BHS and history of falling and striking the head (P-value < 0.001) but we didn't find anything about this factor in literature review. This inconsistency may be related to selection bias or information bias. More than 30% of our cases had positive history of falling and striking the head and 61.5% of them had this experience under one year of age. Overall in our cases the age of BHS onset was under 2 years of age in agreement with DiMario study (8) but other studies mentioned higher ages of onset (6,7). We found no significant relation between BHS and sleeping.

Breath-holding spell questionnaire form

- Surname:..... First name:.....
- Age (month):.....
 - Sex: 1-male 2-female
 - Birth weight (gram):.....
 - Birth order:.....
 - History of falling and severe striking the head:
1-yes 2-no
 - If the answer of prior question is «yes» write down: age of severe striking the head (month):.....
 - Delivery type: 1-vaginal 2-cesarian-section
 - Type of labor initiating: 1-spontaneously 2-induction 3-rupture of membranes 4-without pain (cesarian-section)
 - Labor duration (hour):.....
 - History of BHS: 1-yes 2-no

If the answer to 10th question is yes, please answer to these series of questions:

- Age of BHS onset (month):.....
- Frequency of attacks: 1-daily 2-weekly 3-monthly
- Attacks occur more at which time during the day: 1- 6 am- 12:00 2- 12:00- 6 pm 3- 6 pm- 12:00mn 4- 12:00 mn- 6 pm 5- they may occur at any time during the day.
- Relation of BHS initiating to sleep: 1- after awaking 2- about getting to sleep 3- during sleep 4- both 1 and 2 5- there is no relation to sleep
- Time of last attack (month):.....

BHS triggering factors (16-22):

- 16- painful experience: 1-yes 2-no
- 17- Falling and striking the head: 1-yes 2-no
- 18- Coughing: 1-yes 2-no
- 19- Withdrawal of favourite object: 1-yes 2-no
- 20- Frustration: 1-yes 2-no
- 21- Upsetting or scolding: 1-yes 2-no
- 22- Sudden changing of the child position: 1-yes 2-no
- 23- BHS type: 1-cyanotic 2-pallid 3-both types may occur
- 24- History of BHS in siblings: 1-yes 2-no
- 25- Attacks duration: 1-less than 1 minute 2-one minute or more

Which of these symptoms may occur during BHS in your child?

- 26- Tongue biting: 1-yes 2-no
- 27- Jaw locking: 1-yes 2-no
- 28- Loss of bladder control: 1-yes 2-no
- 29- Abnormal motion of extremities (seizure): 1-yes 2-no
- 30- Unconsciousness: 1-yes 2-no
- 31- Vomiting: 1-yes 2-no
- 32- Nausea: 1-yes 2-no
- 33- Perspiration: 1-yes 2-no

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