SEVERE COUGH AND RETINAL HEMORRHAGE IN INFANTS AND YOUNG CHILDREN

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No retinal hemorrhages were detected in any of 100 consecutive children aged 3 months to 2 years with severe, persistent coughing (0 of 100, 95% CI: 0%- 3%). Therefore, if one finds retinal hemorrhage in infants and young children with cough, child abuse must be excluded. ***(J Pediatr 2006;148:835-6)***

Child abuse is a common and serious problem with significant mortality and morbidity rates. Up to 1% of the children in the United States are reported to be abused or neglected, with a mortality rate of 5% to 20%.[1,2] Retinal hemorrhage is a common finding in child abuse, mainly in "shaken baby syndrome," and has been reported in 38% to 100% of children with nonaccidental head injury.[1] Other reported causes of retinal hemorrhage in children include accidental trauma, bleeding disorders, infections, and vaginal delivery in newborns.[1-3] The latter usually resolves within a few weeks.[4] In adults there have been several reports of retinal hemorrhage after a Valsalva maneuver, termed *Valsalva retinopathy or maculopathy*.[5] This rapid rise in intraabdominal and intrathoracic pressure can be seen with coughing, vomiting, and weight lifting.[3] The goal of this study was to investigate whether severe persistent coughing might cause retinal hemorrhage in young children.

METHODS

The study was approved by the Ethics Review Board of the Assaf Harofeh Medical Center, Israel. All children aged 3 months to 2 years admitted to the Department of Pediatrics, Assaf Harofeh Medical Center, Israel, with severe coughing were eligible for the study. Severe coughing was defined as (1) coughing ≥3 days, (2) reason for referral to the Emergency Department, and (3) hospitalization required. Children were excluded if there was any evidence of child abuse via history, physical examination or laboratory results, or a history of vomiting (except posttussive emesis), cardiopulmonary resuscitation, accidental trauma, leukemia, bleeding disorders, sickle cell disease, rickets, or malaria. After a signed informed consent was obtained, a detailed history was obtained from the parents, and a physical examination was performed. Blood was obtained for complete blood count and cultures, and a chest x-ray film was obtained. Other laboratory studies were carried out according to need (such as nasopharyngeal swab and polymerase chin reaction [PCR] for pertussis). Upper respiratory tract infection, acute laryngitis, acute bronchitis, bronchiolitis, bronchopneumonia, lobar pneumonia, and asthma exacerbation were diagnosed according to history, physical examination, and laboratory test results. Pertussis was defined as a paroxysmal whooping cough lasting for ≥14 days, and at least one of the following: a positive nasopharyngeal culture, PCR, or a positive immunoglobulin M antibody for Bordetella pertussis.[6,7] Pertussis-"like" syndrome was defined as a paroxysmal whooping cough with a negative culture, PCR, and immunoglobulin M antibodies. All children underwent an ocular examination by an experienced pediatric ophthalmologist (Y. Morad) within 48 hours of admission, as follows: tropicamide 1% drops were instilled into each eye; external ocular examination was performed with a slit-lamp microscope; and fundus examination was carried out by use of an indirect ophthalmoscope and a 20-diopter lens. Similarly to Herr et al,[3] we applied Hanley's "rule of 3" in calculating our sample size, meaning that if we examined 100 patients and found no retinal hemorrhage, then the 95% confidence interval would be 0% to 3%.

RESULTS

From July 2004 through September 2005, 122 consecutive patients who met the inclusion criteria were asked to participate in the study, and 100 were enrolled in the study. Of the 100, 65 were male. Patient age ranged from 3 to 24 months, with a mean age of 8.88 months (±6.03 months) and a median age of 7 months. The duration of coughing before the ocular examination ranged from 3 to 31 days, with a mean of 8.04 days (±6.8), and a median of 6 days. Clinical diagnoses at discharge are shown in the

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Table. Diagnoses in 100 patients with cough

Diagnosis	Number
Pertussis	1
Pertussis-"like" syndrome	5
Upper respiratory tract infection	2
Asthma exacerbation	13
Bronchiolitis	19
Acute laryngitis or tracheobronchitis	21
Lobar or bronchopneumonia	36
Cough (unspecified)	3
Total	100

Table. No retinal hemorrhages were detected in any of the 100 patients (0 of 100, 95% confidence interval: 0%-3%).

DISCUSSION

Early diagnosis of child abuse is crucial to reduce morbidity and mortality rates.[1,2] However, an incorrect diagnosis may cause severe psychological distress to the family, termed "medical abuse" by Kirschner.[8] Although retinal hemorrhages are a potential manifestation of child abuse, especially for "shaken baby syndrome," their existence has also been described in other clinical settings.[1-3] Recently, Herr et al[3] examined 100 infants with forceful vomiting caused by hypertrophic pyloric stenosis, and none demonstrated retinal hemorrhage. The authors concluded that Valsalva retinopathy does not occur in children. Reports on retinal hemorrhage induced by coughing are scanty, mainly in adolescents and adults with pertussis.[6,9] No retinal hemorrhages were detected in any of the 100 examined patients. Therefore, if one finds retinal hemorrhage in infants and young children with cough, it is unlikely that coughing per se is the reason for the hemorrhage.

Morbidity and death caused by child abuse mainly occur in infants and young children.[1,2] Therefore we limited the age range of our patients to infants and young children aged 3 months to 2 years. It is possible that older children with severe coughing may generate higher and longer pressure leading to retinal hemorrhage. Another possibility is that the vitreous consistency, which is much more viscous than in adults, creates a tamponade that prevents bleeding in infants. We included only infants older than 3 months to overcome possible persistence of labor Valsalva retinopathy that usually resolves within a few weeks after delivery.[4] One limitation of our study is the absence of an acceptable grading scale for the severity of cough. Therefore, to select patients with severe coughing, we included children with cough lasting ≥3 days, who were referred to the Emergency Department because of coughing and needed hospitalization.

In conclusion, in this study we did not detect retinal hemorrhages in 100 consecutive children with severe coughing. Therefore, if one finds retinal hemorrhage in infants and young children with cough, child abuse must be excluded.

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